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ARCHAEOLOGY IN ALBERTA 1988 and 1989

Martin Magne

Alberta
CULTURE AND MULTICULTURALISM

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Edited by
Martin Magne

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ARCHAEOLOGY IN ALBERTA, 1988-1989

by

John W. Ives
Assistant Director, Archaeology and Ethnology
Provincial Museum of Alberta

INTRODUCTION

With this volume, the Archaeological Survey of Alberta marks the close of an eventful decade. The 1980s saw continued evolution in the role of archaeological work in Alberta; by late 1990, fundamental changes to the organization of the Historical Resources Division, and hence to the Archaeological Survey, came into play.

While Archaeological Survey of Alberta activities in the 1970s lay principally in the area of historical resource management, the last decade witnessed an increasing diversification of tasks, with expanded roles in all areas of the mandate developed for the organization in its early years. To be certain, the decade began with a tremendous level of development activity, continuing a trend from the 1970s. By 1982, however, economic conditions dampened the extraordinary volume of historical resources impact assessment and mitigation work that was characteristic of Alberta's boom years. The precipitous fall of petroleum prices in 1986 further diminished the amount of work in this area, and it was not until 1989 that impact assessment and mitigation activities returned to earlier levels. Throughout the 1980s, both Research and Resource Management Section staff worked diligently to refine archaeological resource management procedures.

As this economic cycle acted itself out, the Survey became involved in other projects--work that broadened the scope of archaeology in Alberta. In 1980, the Strathcona Archaeological Centre opened on the east edge of Edmonton, with the purpose of allowing members of the general public to see and take part in archaeological excavations. This was accomplished through funding of the University of Calgary field school in archaeology, and through the operation of a volunteer program for avocational archaeologists. More than 100,000 visitors came to see the site and its interpretive centre, and several hundred of these had direct experience in ongoing archaeological field work.

Of course, the largest effort in this vein was the development of Head-Smashed-In Buffalo Jump. This project was undertaken in collaboration with the Historic Sites Service, and with the advice and assistance of Peigan and Blood elders. Survey staff were pleased to be associated with the development and operation of so fine a facility. It has now been visited by more than 500,000 people, many thousands of whom were also able to view ongoing archaeological excavations in the camp and processing area of the site. This kind of work continued with Archaeological Survey of Alberta contributions to interpretive developments for fur trade posts at Dunvegan and Fort George-Buckingham House in northern Alberta.

Much of our activity in the 1980s involved other forms of public education. Earlier in the decade, the Survey created a position for an education officer, from which followed a needs assessment and then a series of information modules geared to specific slots in the elementary, junior high and high school curricula. So too were produced the Traces, Stories and Choices posters, and most significantly, a publication designed for lay audiences: The First Albertans. An Archaeological Search. About 600 volumes of this popular book were placed in high schools across the province. Although the press run was for 5,000 copies, The First Albertans, is now out of print, underscoring the high degree of public interest in archaeology. Archaeological Survey of Alberta staff also have taught Anthropology 356 (Alberta Archaeology) to more than 500 undergraduates through the Department of Anthropology, University of Alberta.

The last decade was eventful in other ways as well. For instance, it saw the most important debate to this point in time for historical resource management in Alberta, in connection with the development of the Oldman River Dam in the southern portion of the province. The Archaeological Survey of Alberta, the office of the Deputy Chief Medical Examiner in Edmonton, and the Department of Anthropology as well as the Faculty of Extension of the University of Alberta cooperated in two offerings of a forensic archaeology course. The Survey began a collaborative project for its own researchers, "The First Albertans Project," designed to investigate the early episodes in the peopling of the province. We were also in contact with colleagues in Alberta's sister province of Heilongjiang, China, with respect to mutual interests we share in the peopling of the New World.

The decade was not without its challenges, the most signficant of which came with the mood of fiscal restraint predominant later in the decade. This occasional paper itself is a sign of the times, in that it has permitted us savings through the combination of two annual reviews. The most important development in this connection came late in 1990 with the reorganization of the Historical Resources Division of Alberta Culture and Multiculturalism. Formerly comprised of the five separate branches (the Archaeological Survey of Alberta, the Provincial Museum of Alberta, the Historic Sites Service, the Royal Tyrrell Museum of Palaeontology, and the Provincial Archives of Alberta), the Historical Resources Division was reduced to three branches: the Provincial Museum of Alberta, the Historic Sites and Archives Service, and the Royal Tyrrell Museum of Palaeontology.

The Archaeological Survey of Alberta was broken into its two component parts, with remaining Resource Management Section staff becoming part of a newly defined Planning and Resource Management Section within the Historic Sites and Archives Service. Remaining Research Section staff of the Archaeological Survey became part of a newly defined Archaeology and Ethnology Section at the Provincial Museum of Alberta (see diagram at end of text, p. 14). The responsibilities of the Assistant Director for this section will continue to include those of being the Provincial Archaeologist. All archaeological programmes for the province, from resource management through to curation, are now concentrated within this single section. An important element of the reorganization resulted in transfer of responsibility for the Head-Smashed-In Buffalo Jump Interpretive Centre to the Archaeology and Ethnology Section, Provincial Museum of Alberta. The province's ethnology programme will continue in the same form. Funding restraints also required the closure of the Strathcona Archaeological Centre.

Research Section and administrative staff moved from Old St. Stephen's College to the Provincial Museum of Alberta in March of 1991. Naturally, such extensive changes have caused a degree of apprehension and sadness. At the same time, however, the situation of the Archaeological Survey within the Provincial Museum of Alberta opens new horizons, particularly in promoting the public understanding of archaeology through exhibits and a broad array of public programmes at the Provincial Museum of Alberta. The 1990s seem likely to bring continued challenges; it nevertheless remains our intention to work actively in all areas of the original mandate of the Archaeological Survey of Alberta, especially where this will involve an interplay between ourselves, members of the native community, members of the avocational community, and the general public.

RESEARCH IN ALBERTA, 1988

A total of 109 permits was issued for 1988: 78 for impact assessments, 18 for mitigation projects and 13 for research. Inventory additions included 471 newly recorded sites, 132 sites revisited and 817 site records submitted and added to the Canadian Heritage Inventory Network.

Research activity in Alberta during 1988 increased slightly over that of previous years. A principal concern was the Oldman River Dam project, which involved the cooperative efforts of four separate field units conducted by three different consulting firms. In addition, 1988 marked the second year of field work for the Archaeological Survey of Alberta's First Albertans Project. This project is being carried out by several different research teams. Site prediction concepts developed from previous work were applied to the upper Bow River valley, east of Banff National Park. In another facet of the First Albertans Project, J. Rod Vickers, Plains Archaeologist, completed excavation of a 2 x 2 m unit into the bone bed at the Fletcher site, DjOw-1. These researchers provide more information in this volume.

In northern Alberta, First Albertans research was carried out in the Birch Hills region of northern Alberta by Milt Wright (Boreal Archaeologist). Private collections from the region continue to yield an impressive number of early prehistoric point styles, including variations of the "stubby fluted point" type identified at Charlie Lake Cave. A substantial contribution of the First Albertans Project was completion of the Annotated Bibliography of the Late Quaternary Geology, Palaeontology and Palaeoenvironments of the Western Corridor of Alberta (1950-1987) by Alwynne Beaudoin (Palaeoenvironmental Research Officer).

Beaudoin is completing pollen analysis of a series of core samples recovered from three distinct stratigraphic levels in Lake O'Hara, Yoho

National Park, in cooperation with Mel A. Reasoner. Beaudoin also has undertaken macrofossil analysis of 50 samples from the "Wood Bog" site located near Grande Prairie in northwestern Alberta. A variety of material was recovered in the samples, including seeds, plant fragments, moss fragments, insect remains, gastropods and ostracodes. About 50 different seed types have been distinguished so far, although not all have been firmly identified as yet. This record extends to about 9,200 years BP.

Jack Brink (Senior Archaeologist), Brian Ronaghan (Eastern Slopes Archaeologist) and Bob Dawe (Head-Smashed-In Research Archaeologist) continued research at Head-Smashed-In Buffalo Jump (DkPj-1). As in previous years, work focused on recovery and analysis of remains from the lower prairie level area of the site. Excavation units were placed adjacent to the 1987 units to allow for eventual exposure of a large, contiguous portion of the processing area. This will provide a larger, more detailed view of bison processing than has been possible at other plains bison kill sites. The 1988 field season was the sixth consecutive year of field work associated with the development of the site as a provincial interpretive centre.

Martin Magne, Assistant Director, in cooperation with Doug Curran (Prometric West Inc.), Ian Campbell (Department of Geography, University of Alberta), Ian Wainwright (Canadian Conservation Institute) and Gilles Barbeau (Public Works Canada), conducted conservation research on the rock art at Writing-On-Stone Provincial Park. The work focused on four areas of concern: detailed inventory, pictograph deterioration, monitoring petroglyph erosion and macro/micro-mechanical erosion processes. Results to date include development of a high resolution photographic restitution technique and increased understanding of the effects of permeability, salt efflorescence, freeze-thaw and water in general, on the sandstone of the area. In addition, Magne and Michael Klassen (Research Assistant) are analyzing variability present in the anthropomorphic motifs at Writing-On-Stone. The focus of this work is to investigate stylistic change over space and time.

Heinz Pyszczyk, Historic Archaeologist, undertook work in the Lac La Biche, Fort Vermilion and Edmonton areas. His work in the Fort Vermilion region of northern Alberta included both survey and excavation. The majority of time was spent on a late 18th century fur trade post located at the confluence of the Peace and Boyer rivers. Results from the work indicate that the post is likely the 1788 North West Company, Boyer River Post. It is one of the earliest sites from 200 years of permanent European occupation of the area. Pyszczyk's work in Edmonton involved mitigative investigations of the Pollard Brickyard/Beddard Tannery site, instituted as a result of construction of a new bridge for light rail transit expansion. Surprisingly, work at this early 20th century urban industrial site yielded a large assemblage of household refuse. Pyszczyk plans to investigate this assemblage in relation to similar rural assemblages, in order to examine differences in consumption between the two. At Lac La Biche, Pyszczyk worked with the Lac La Biche Historic Mission Preservation Society and undertook mitigative survey and surface collection at the Oblate Mission site. Historical materials and information recovered will be important in future interpretive developments.

Michael Forsman, Historic Archaeologist, continued research and resource management excavations at Fort Chipewyan III, western Lake Athabasca. The results of this work contributed to the efforts of the Fort Chipewyan Bicentennial Society's commemorative plans. Portions of palisade lines along the south, west and north sides of the fort were exposed, and stratified deposits were uncovered in the north midden area. The absence of trenches outlining the bastions has supported the idea that the bastions were erected using a horizontal log construction.

Bruce Ball, Parkland Archaeologist, initiated a collections documentation program, known as Project PAST, designed to record the nature of private collections of archaeological materials for the central area of the province. Funded by Canada Employment and Immigration, this was a Strathcona Archaeological Society project which operated with the assistance of the Archaeological Survey of Alberta. The project employed six individuals, with Franca Boag as supervisor.

Dr. Gerald Oetelaar, Department of Archaeology, University of Calgary, directed the research and public archaeology programs at the Strathcona Archaeological Centre in 1988. The principal research focus is lithic technology, particularly debitage variability across different areas of the site. Analyses are aimed at understanding patterns of refuse disposal and general site use.

The first of three years of historical resource mitigation at the Oldman River Dam project constituted the largest and most complex archaeological study in the province in 1988. When completed, it will have been the largest in Alberta's history. Funded by Alberta Public Works, Supply and Services under the requirements of the Alberta Historical Resources Act, the project is being managed under contract by John Brumley, Ethos Consultants Limited, and focuses on the mitigation of significant sites within the reservoir impact area. Completion of the dam and reservoir inundation are scheduled for 1991.

Excavations on significant resources were conducted at over 50 of the 170 prehistoric sites recorded within the dam's flood area. Sites selected for investigation were grouped into three types, based on their principal features or apparent function: campsites, kill sites and stone feature sites. A separate consulting firm has been selected for each site type. The project research design, which stresses thematic research goals and standardized field and lab systems, unifies the activities of the three consulting teams working on each of the site types.

Stan Van Dyke of Bison Historical Services heads up the campsite mitigation team. A total of 17 prehistoric campsites, located on terrace features found throughout the basin, was investigated. These ranged from small, single component scatters to large, buried, stratified campsites containing upwards of eight occupations. Although one site has been dated to the Early Prehistoric Period, the bulk of the occupations date to the Late Middle and Late Prehistoric periods. Metal points and trade beads recovered at two sites indicate that valley use continued through protohistoric times.

Alison Landals, Environmental Management Associates, conducted excavations at 14 kill site localities. As with campsites, a variety of kill site types are present, ranging from small single component manifestations to large, well stratified sites. Included in the sample are two single event, Late Prehistoric bison jumps that apparently involved small herds and possibly the use of horses in the drive mechanism or for meat transport. A massive kill processing site (DjPm-116) firmly dates to the Pelican Lake Phase (ca. 2,500 years BP) and provides evidence of large-scale, pedestrian communal bison driving which entailed use of an abandoned river channel.

Barry Dau, Ethos Consultants, investigated a total of 19 stone feature sites. Overall, little cultural material was recovered from the stone feature sites. From the diagnostic material present, however, it appears that occupation of these sites was restricted primarily to the Late Prehistoric Period, extending into historical times in some cases. It is believed that these sites may represent short-term summer occupations; this might account for the lack of artifactual materials present. Short-term summer occupation at the stone feature sites is a different seasonal use pattern than that which is apparent in the data recovered from the campsite and kill site excavations.

In other work, James Light, Historical Resource Management Ltd., conducted highway mitigation work, funded by Alberta Transportation and Utilities, at a stone ring site (ElPb-3) near Stettler. The surface feature on which the site was recorded dates to the Late Prehistoric Period, while a subsurface occupation is of the Middle Prehistoric Period. Unlike many ring feature sites, both occupations contained substantial numbers of lithic artifacts and some faunal remains. Undisturbed sites of this nature are rare in this farming region.

Alberta Transportation and Utilities also funded mitigation excavations at the Stratton Peake site (EgOx-34) south of Drumheller. Glenn Stuart, Fedirchuk McCullough & Associates Ltd., directed work at this stone feature site found near the junction of two small tributaries of the Red Deer River. Of the 15 features recorded at the site, three were completely excavated, as was a substantial area between the rings. Stratified components of the site date to historical and Late Prehistoric times.

Northern archaeological resource management projects were few in number. One survey of a Peace River flood plain area resulted in the documentation of a large, deeply stratified site. Peter Bobrowsky directed mitigative excavation of the site. He was assisted by Eric Damkjar and Terry Gibson. While few artifacts were recovered, the site displays at least nine separated palaeosols that extend to more than 7,000 years BP.

In 1987, Rod Pickard and Daryl Fedje, Canadian Parks Service, Western Region, identified a deep, well-preserved stratigraphic section above the Athabasca River within Jasper National Park. The Canadian Parks Service contracted Bison Historical Services to investigate the site, and Tom Head directed an excavation of the site in 1988. One of the more fascinating results of the excavation was the discovery of obsidian artifacts from an occupation level dated at 7840 ± 70 years BP (To-1026). Source analysis of the obsidian shows that the materials originated from both the Edziza and Anahim quarries in British Columbia.

Raymond LeBlanc directed the Department of Anthropology, University of Alberta's field school in excavations at the Slump site (GiQa-3) located on the shore of Lesser Slave Lake in Hilliard's Bay Provincial Park. Work at the site continued from May 17 to June 23, with 13 graduate and undergraduate students taking part.

Lynda Gullason conducted archaeological investigations at the Fort George Plantation site as part of her graduate thesis requirements for the Department of Anthropology, University of Alberta. The area investigated is a native campsite associated with historical Fort George and Buckingham House. These are located on the North Saskatchewan River near Elk Point. Detailed mapping and test excavations revealed the remains of a small building and artifactual material of the same age as the forts.

Eugene M. Gryba completed a report on occurrences of fluted points in Alberta. This project was funded by the Alberta Historical Resources Foundation and includes descriptions of over 170 "Fluted Point Tradition" types. The documented specimens are almost exclusively from private collections and range from classic Clovis and Folsom types to Plainview and Midland examples.

RESEARCH IN ALBERTA, 1989

In 1989, a total of 118 permits was issued for archaeological work in Alberta: 89 for impact assessment work, 13 for mitigation studies, one for inventory, one for monitoring and 14 for research projects. The majority of the permits (49) were for projects located in the plains region of the province. Of the others, 23 were in the parklands; 19 were in the boreal forest; and 27 were in the eastern slopes regions. A total of 418 new sites was recorded as a result of this work.

During 1989, Alwynne Beaudoin (ASA) concentrated on projects already in progress. Analysis of sediments from the Fletcher site near Taber has yielded abundant plant macrofossils, notably seeds. Information on seed identification is scattered in the literature, and little of it deals specifically with seeds of western Canadian plants. As a result, some effort has been directed towards the compilation of a reference collection and identification manual of Alberta seeds.

Milt Wright (ASA) continued survey of shoreline features of Glacial Lake Peace, with the assistance of Junior Forest Rangers. In addition to site survey, remains of a turn-of-the-century fur trade post near Musreau Lake were documented, and test excavations were undertaken at the Saskatoon Mountain site (GhQt 4) west of Grande Prairie. This cliff top dune site revealed stratigraphic deposits with lower components dating to 8,100 years BP. Research at Saskatoon Mountain was conducted as part of the First Albertans Research Project.

Raymond LeBlanc (University of Alberta) continued the Department of Anthropology Field School excavations at the Slump site on Lesser Slave Lake in May and June. Thirty 1 x 1 m units were dug on the upper terrace bench of the site, north of the 1988 excavations. Highlights of the 1989 work include recovery of 29 pieces of obsidian, a much improved sample of implements, including scrapers and projectile points, and several features. Among the latter is a large hearth which produced quantities of ash and faunal fragments, along with three dense clusters of thermally fractured rock fragments. The faunal remains are small in size and are mostly fish bones. The rock fragments originated from small pebbles which were broken intentionally before burning.

John Priegert (University of Alberta) initiated his M.A. research at Iosegun Lake and in Carson-Pegasus Provincial Park. This research combined a program of site survey along relict lake shore features of Iosegun Lake with the excavation of GbPv-1 on Carson Lake.

Michael Forsman (ASA) directed excavations on the North West Company's Fort George, funded largely by the Elk Point Historical Society through a Northern Development Agreement between the federal and provincial governments. This fur trade site, occupied between 1792 and 1800, is the earliest of the 'Fort des Prairies' in what is now eastern Alberta. Excavations focused on the main house. Portions of this structure had been researched previously by Robert Kidd (Provincial Museum of Alberta) in the 1960s. More comprehensive exposure has revealed new information on building techniques and the history of the site. Approximately 112,000 artifacts and faunal and botanical specimens were recovered. Results will aid in planning and developing an interpretive centre at the site, work which is being undertaken by Alberta Culture and Multiculturalism and the Elk Point Historical Society.

Archaeological investigations were conducted at historic Dunvegan under the direction of Brian J. Smith. This project was also funded by a Northern Development Agreement. Work was centered around the 1877 Hudson Bay Company Factor's House and the 1890s St. Charles Oblate Mission church. Both buildings are slated for total restoration. Considerable structural remains were exposed around and at the back of the Factor's House. A stratified prehistoric component, dating to ca. 2,000 years BP, was identified at the St. Charles Mission site. Planning for interpretive development of the site has been undertaken by Alberta Culture and Multiculturalism and the Dunvegan Historical Society.

Archaeological field work, in a public interpretation format, continued at the Head-Smashed-In Buffalo Jump UNESCO World Heritage site in southwestern Alberta. Sponsored by the Archaeological Survey of Alberta, and under the direction of Jack Brink, with assistance from Bob Dawe and Brian Ronaghan, the 1989 season marked the seventh consecutive year of research at Head-Smashed-In. The two major goals for the project have been to continue archaeological research into the massive deposits associated with the butchering and processing area located below the kill site and to provide interpretation to the visiting public. Twenty 1 x 1 m units were excavated in areas adjacent to those of the previous two seasons, making a total contiguous excavation area of 44 square metres for the past three seasons. This area provides a detailed look at the features and artifacts associated with bison processing activities spanning at least the past 2,000 years. Analysis and reporting of the results of the 1989 season is proceeding and will be combined in a final report with the previous two seasons. Focus of analysis has been on the preferential selection of skeletal elements from the kill site for subsequent processing, and on strategies of lithic economy at major preplanned communal hunts.

Also at Head-Smashed-In, Brian Kooyman (University of Calgary) began a new excavation in the bone bed deposits. This is the beginning of a multiyear project focusing on bone bed taphonomy and kill site butchering practices at the site. This project was funded by the Alberta Historical Resources Foundation and was supported by the Archaeological Survey of Alberta. A 6 x 6 m unit was opened in the "North Kill" area, immediately adjacent to previous excavations by Reeves and Forbis. An "Old Women's" horizon was partially excavated.

On behalf of Alberta Transportation and Utilities, Fedirchuk McCullough Associates conducted mitigative excavations at DkPj-35, a prehistoric butchering site associated with the Head-Smashed-In Buffalo Jump complex. Excavations revealed a thin but rich deposit of broken bison bones, lithic remains, features and fire-broken rock. Although not yet demonstrated, it is believed that DkPj-35 was a bison processing site associated with yet another bison jump located some 800 m southwest of Head-Smashed-In. Initially, the site was threatened by a new road, but plans for construction of this alignment have been abandoned for the foreseeable future.

Barry Newton (ASA) and Brian Ronaghan continued site survey and deep testing work in the upper Bow River valley east of Banff National Park. The 1989 field season combined additional survey of exposures along the Bow River with backhoe testing of sites identified as either having pre-Mazama occupations or the potential to contain such occupations. This work resulted in the discovery of four new sites, including a stratified multicomponent bison kill, with a presumed pre-Mazama level (this volume). Backhoe testing was conducted on four previously recorded sites and resulted in the identification of pre-Mazama occupations on three of the sites.

Gerald Oetelaar directed the University of Calgary's Field School at the Strathcona archaeological site. Results thus far indicate that the site operated more as a multiuse campsite than strictly as a quarry or workshop. Studies included investigation of fracture patterns in fire-broken rock, examination of quantitative variations in the vertical distribution of microdebitage, the extent of site disturbance and lithic reduction sequences. In addition, more than 70 volunteers participated in a public archaeology program. This program offers volunteers the opportunity to learn about archaeology first hand, in the pits and in the lab.

Bruce Ball (ASA) continued Project PAST. Seventy-one collections, mostly located in the central parklands region of Alberta, were photographed and recorded. Results and discussion of this project will be presented in the form of a book written for both amateurs and professionals. Ball also undertook a survey of the Hand Hills area to recover samples of a locally available rock called Hand Hills agate. This material looks very similar to Knife River Flint. An analysis of this rock type, comparing the Hand Hills samples with samples from the Knife River source and samples from Alberta archaeological sites, has been initiated by Ball and Lisa Mutch (University of Alberta).

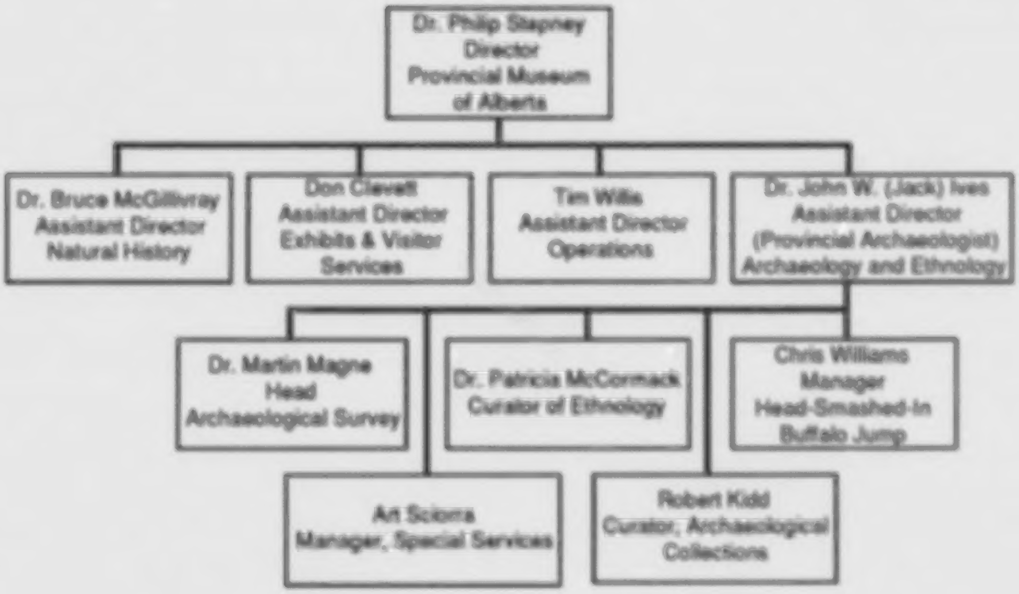
Ed McCullough (Fedirchuk McCullough and Associates) completed baseline studies for the Other Six Leases Operation (OSLO), northeast of Fort McMurray. The OSLO lease area is well removed from the Athabasca River valley, but the proximity of the project area to the Bezya microblade technology site (HhOv-73) suggested some potential for similar sites on ridges and knolls within the proposed strip mine development area.

The second year of a three year archaeological mitigation program at the proposed site of the Oldman River Reservoir took place in 1989. The campsites component (Stan Van Dyke, Bison Historical Services) involved excavations at 13 sites, including a 9,600 year old single component site and a large, well-stratified 13 component site encompassing 6,000 years of occupation. The kill sites component (Alison Landals, Environmental Management Associates) comprised investigation at 13 sites, including two small bison jumps and a large Pelican Lake Phase kill, possibly involving some sort of corral mechanism. The stone features component (Barry Dau and Bea Loveseth, Ethos Consultants) focused on a protohistoric multiple feature site, where an extremely diverse and well-preserved assemblage was recovered. In an independent but related study, five historical period sites in the reservoir area were investigated through excavation and other forms of documentation (Rebecca Balcom, Environmental Management Associates). These represent a sample of occupations which vary significantly on the basis of ethnicity, social standing and economic venture type.

At Writing-On-Stone Provincial Park in southeastern Alberta, Martin Magne continued photographic documentation and conservation research. Douglas Curran (Prometric West Inc.) continued standard camera and photogrammetric photography of petroglyph and pictograph sites, completing a high quality record of the north side of the park. Digitizing processes have been refined to permit submillimetre restitution of the rock art panels with very low margins of error. In addition, five erosion monitoring stations measuring 1 x 1 m were placed in areas of varying exposure to the elements. Photogrammetric techniques will be employed to attempt measures of surface erosion over a period of years.

The combined results of 1988 and 1989 archaeological work in Alberta represent an extraordinary diversity of resource management, research and interpretive projects in this province. I would be remiss if I did not observe that the overall volume of work at the end of the 1980s increased sharply over the comparatively quiet years of the middle of the decade. In fact, the total number of permits for 1989 marked an increase of roughly 40% over 1986-1987 levels. One can only hope that both of these trends in quality and quantity of archaeological investigation carry forward into the 1990s.

PROVINCIAL MUSEUM
OF ALBERTA


Dr. Philip Stepney
Director
Provincial Museum
of Alberta
Dr. Bruce McGillivray
Assistant Director
Natural History
Don Clevett
Assistant Director
Exhibits & Visitor
Services
Tim Willis
Assistant Director
Operations
Dr. John W. (Jack) Ives
Assistant Director
(Provincial Archaeologist)
Archaeology and Ethnology
Dr. Martin Magne
Head
Archaeological Survey
Dr. Patricia McCormack
Curator of Ethnology
Chris Williams
Manager
Head-Smashed-In
Buffalo Jump
Art Sciorra
Manager, Special Services
Robert Kidd
Curator, Archaeological
Collections

OLDMAN RIVER DAM HISTORICAL SITES MITIGATION, 1989

By
Rebecca J. Balcom
Environmental Management Associates

INTRODUCTION

Environmental Management Associates was contracted by Alberta Public Works, Supply and Services to undertake the historical period archaeological site mitigation component of the Oldman River Dam project. Five sites were selected for mitigation by Alberta Culture and Multiculturalism from the 46 historical sites recorded by Lifeways of Canada Ltd. in 1985 (Kennedy and Reeves 1986). These sites, and a sixth which was added during the course of the field investigations, were examined during the summer of 1989 (Figure 1), and the results are being analyzed in conjunction with historical research undertaken by Great Plains Research.

At this time, only preliminary interpretations of the findings are available. A large database has been generated, but there has been considerable mixing of occupations at some of the sites. The purpose of this paper is to discuss the site types being investigated and the directions of the research.

THE PROJECT

Initially, five sites were to be studied within the context of three major themes: settlement, ranching and resource development. The settlement theme was to be addressed by examining the Doukhobour village remains at the Maloff Farm site and the LaBrie and Cooper homesteads, the ranching theme by the F.W. Godsal Cowley Ranch, and resource development through investigation of the Gillingham Sawmill site. Since this site turned out to be the Biggar Homestead and no since evidence of the sawmill was found, the Cook Dairy was added to address the resource development theme.

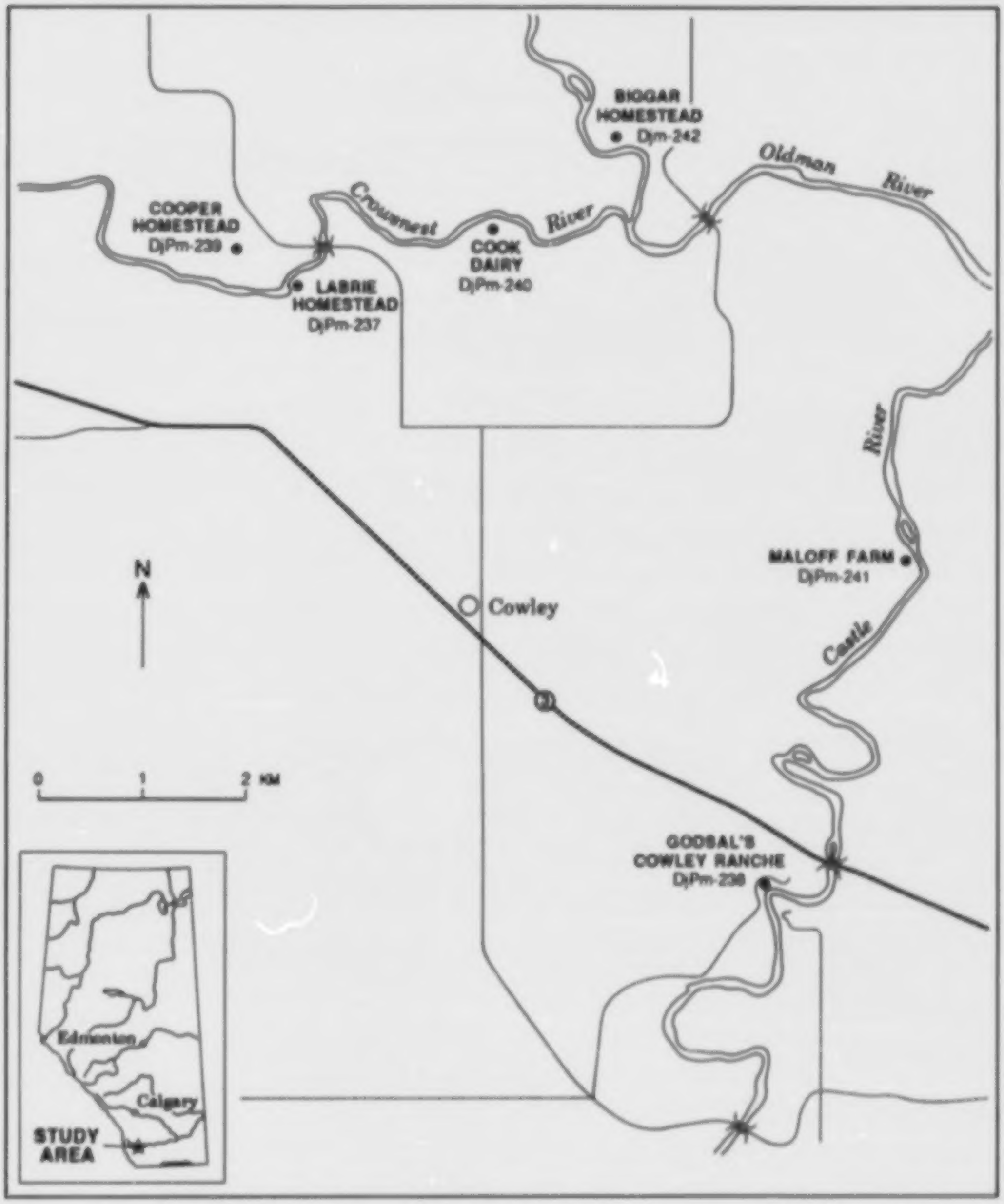

BIGGAR
HOMESTEAD
Djm-242
Oldman River
COOPER
HOMESTEAD
DjPm-239
Crowsnest River
COOK
DAIRY
DjPm-240
LABRIE
HOMESTEAD
DjPm-237
River
MALOFF FARM
DjPm-241
N
Cowley
Castle
0
1
2 KM
GODSAL'S
COWLEY RANCHE
DjPm-238
Edmonton
Calgary
STUDY
AREA

Figure 1. 1989 Oldman River Dam historical program, sites locations.

In addition to using material culture to address aspects of human history and settlement in southwestern Alberta within the context of the three themes, contributions will be made to the field of historical archaeology. It is expected that the research will allow us to study socio-economic status, household life cycles, economic fortunes (or misfortunes) of individual households, material culture and activity patterning and so on.

In order to compare the assemblages recovered within each major theme, the artifacts were divided into activity groups, a variation of South's (1977:95) artifact classification system. These include household goods, personal articles, structural artifacts, work activity artifacts, transportation and agriculture-related artifacts, miscellaneous and unclassified artifacts, and flora/fauna. Each of these categories was then subdivided into finer groupings such that artifacts with known, specific functions could be placed within much tighter classifications. The deviation from South's system was related directly to the software program utilized during the cataloguing and is based on research undertaken by Brandon at Batoche and at several southern Saskatchewan homesteads (Brandon, personal communication).

LABRIE HOMESTEAD (DjPm-237)

The LaBrie Homestead is located on the south side of the Crowsnest River. Edmond LaBrie was born in Quebec and came to the Cowley area in 1910 with three brothers and nine brothers-in-law. They built a house close to the river and a shack under the cliffs. Edmond married in 1922, and the shack was joined onto the house to make a home for the couple. A barn and a chicken coop with attached bachelor quarters were also located on the property. The entire homestead burned in a fire in 1935 (Kennedy and Reeves 1986:79-81).

Other than the fire, disturbance to the site area at the time of the mitigation had been limited to cattle grazing. Only the location of the house was established positively during the mitigation. Surface examination, shovel testing and metal detector surveying failed to reveal other features. Twenty square metres were excavated at the site, primarily on the cobble house foundation. Because the house had burned and abandonment was rapid rather than intentional, artifact recovery (n=12,197) was higher per square metre at this site than elsewhere. As a result of the high recovery rate, the artifact categories are better represented here than at the any of the other excavated sites; however, the ranking of the classes according to percentage of artifacts within each activity group remains similar to the trends observed at the majority of the assemblages examined. Structural and miscellaneous/unclassified categories rank high.

Because many of the artifacts have reached archaeological context without the performance of discard activities, they fall into Schiffer's (1972:160) de facto refuse category. With this type of abandonment, no change occurs in the provenience of the artifacts or their distribution among the various life cycles (i.e., systemic context). Therefore, structural/functional analysis of the excavated areas of this site is facilitated, whereas intentional abandonment hampers this type of reconstruction. Although a higher amount of personal artifacts are expected with rapid abandonment, the artifact assemblage is primarily utilitarian in nature, consisting for the most part of essential items. Only a few artifacts are considered to be nonessential, including watch parts, jewellery, a toy marble and a smoking pipe. Beef cuts represented are the less tender ones.

F.W. GODSAL'S COWLEY RANCH (DjPm-238)

Godsal's Cowley Ranch is located on the west side of the Castle River where Godsal lived from 1885 to 1915 until Doukhobours purchased the ranch. Godsal was an important figure in the history of southwestern Alberta. He was a well-travelled English bachelor who arrived in Alberta in 1882 and subsequently was responsible for naming the town of Cowley. Godsal was one of the early big ranchers, and the home he built here was reputed to have been a veritable museum and had every conceivable convenience of the time.

No structural remains were apparent on the surface of the site. Structural remains and features were found by backhoe testing, metal detector surveying and shovel testing. In excess of 100 sq. m of hand excavation was done at the site. with Godsal's house being the primary focus. A total of 8,346 artifacts was collected.

The major contribution of these investigations will be architectural information. The precise location of the house was controversial among informants prior to the excavation. With almost complete excavation of the foundation, the orientation and location have now been ascertained. The Godsal home was torn down by the Doukhobours some time after 1915, and the artifacts (such as Nike running shoes at a depth of 2 m) show that the cellar was used as a landfill until the 1960s (Figure 2). The lack of stratigraphic control has caused problems in defining which artifacts relate to Godsal's occupation. However, some artifacts are temporally diagnostic and do indicate that he maintained a high standard of living. These include alcoholic beverage bottles, jewellery, a gaming piece, perfume bottle, crystal set earphones, electrical items and numerous household goods.

COOPER HOMESTEAD (DjPm-239)

The Cooper Homestead is located on a bench north and west of the Crowsnest River. Thomas Jefferson Cooper, an educated gentleman born in England to a wealthy English family, gained entry to the lease in 1902. He built one house in 1906 and tore it down in 1919 to make way for a new home which was later (after 1920-1921) moved to Pincher Creek. Other structures included a stable, chicken house, root house and two wells (Kennedy and Reeves 1986:72-75).

At the time of the impact assessment, the site area was used for grazing. No standing structures remained, but the location of the houses and stables, as well as an artifact scatter, were found subsequent to visual examination, shovel testing and surveying with the metal detector. A total of 21 sq. m was excavated at these features.

The location of the old house was identified by a mound of cobbles close to a railroad grade which runs through the farm. The new house was identified by exposed portions of a cobble foundation. A total of 629 artifacts was recovered from the entire site; 399 of these were from the old house.

While the artifact assemblages from the other sites are all similar in terms of ranking the relative percentages within activity groups, the assemblage from the Cooper Homestead is quite unique. There are more miscellaneous than structural artifacts, the reversal from any other site.

Figure 2. View to the northwest of the house cellar at Godsal's Cowley Ranch. The disturbed area in the centre of the wall is where the exploratory backhoe trench encountered the foundation. This area is likely the stairwell.

In addition, the transportation/agriculture category rates highest rather than lowest or second lowest like at the other sites. Household goods rank low which is also unusual. This is possibly because the new house was moved to Pincher Creek rather than left to deteriorate naturally.

The assemblage from this site suggests that the Coopers did not have much in the way of material goods. Examining the amount and type of discarded artifacts is a method of studying socio-economic status, and one of the more salient observations about this assemblage is the paucity of discarded artifacts. This does not seem to be a sampling error. It is suggested that the Cooper family was perhaps quite poor.

COOK DAIRY (DjPm-240)

The Cook Dairy (Figure 3) sits on a low terrace approximately 1 m above the Crowsnest River to the north. While other buildings are located on this landform, only the dairy was of concern. The dairy was built

Figure 3. Excavation in progress in front of the Cook Dairy. View is to the north.

between 1902 and 1906 by an American couple, Bela and Mary Cook. They sold the farm to J. C. Drewery in 1906 (Kennedy and Reeves 1986:85-89).

The dairy was investigated because it was a unique structure that represented the industrial theme. The dairy was of brick construction with a brick well in the interior which doubled as a cooling device for the cream. A total of 14 sq. m was excavated here.

A total of 2,250 artifacts was recovered from the excavation adjacent to the dairy. Surprisingly, almost none of these relate to the dairy but appear to be associated with the homestead remains to the east. The artifact categories are ranked similarly to those from the homestead, with miscellaneous and structural categories accounting for the vast majority of the artifacts. Non-household goods include harness and machine parts. Possible dairy related items are limited to a bucket handle and hook, stoneware sherds and glass bottle fragments.

MALOFF FARM SITE (DjPm-241)

The Maloff Farm site is situated on the upper west terrace of the Castle River. Doukhobours purchased this property from F.W. Godsal between 1915 to 1918, and about 50 people subsequently lived here in a village they called "Bozhiya Milost" or "God's grace." A large barn was constructed in 1918 and housed people during the first winter. Subsequently, houses, a blacksmith shop, garages, privies and a communal sauna were built. By 1938, only two families remained in the village (Kennedy and Reeves 1986:1952-157).

The site area has been disturbed almost completely by cultivation and construction of a bungalow on the property. At the time of mitigation, the only original structures remaining were the barn and sauna. The intent was to locate evidence of the other structures through testing and excavation. Two informants who had lived at the Maloff Farm site offered widely divergent opinions as to the location of the houses and associated facilities; however, they did agree that, since the Doukhobours were frugal, there would be "nothing left."

Extensive backhoe testing was done to locate evidence of structures. Forty shovel tests (10 m^2) were also excavated in depressions and along the terrace edge to locate privies reputed to have overlooked the Castle River. A metal detector was used to isolate locales of high ferrous reading, possibly indicative of buried structures or debris.

The commune location was never found. Due to the intensity of the backhoe testing, it seems unlikely that it was missed. Rather, it must have been completely dismantled so that the structural remains could be reused and the land made available for cultivation. A total of 62 sq. m was excavated at other features, including a root cellar, privy, dump, hot box and wherever structural remains appeared to be possible.

A total of 4,536 artifacts was recovered from the excavations. Based on the identification and dating of artifacts, the only features that definitely relate to Bozhiya Milost were the root cellar, privy and dump. The root cellar was used as a dump after it caved in, so it is unknown to which occupation many of the more generic artifacts relate (Figure 4).

Many of the artifacts recovered are glass fragments, nails and other ferrous objects typical of any of the sites excavated. Some interesting

Figure 4. View to the east of the root cellar after partial excavation. Note the galvanized tin dumped here from a local granary. The wine bottles in the upper right and lower left corners date to the mid-1900s.

characteristics were noted in the assemblage, however. This site had the second highest bone content; this is very surprising since Doukhobours are reputed to be vegetarians. Various beef cuts were recovered, including loin/rib end, shank, neck, sirloin butt, blade, oxtail, round and rump. Some of the more nonessential goods recovered from the site include alcoholic beverage bottles, a bead, die, harmonica, finger nail file, skate blade and a smoking pipe.

BIGGAR'S HOMESTEAD (DjPm-242)

Originally thought to be the Gillingham Sawmill site, this site is located on the north side of the Oldman River and is bordered to the north and east by high hills. This land is reputed to have been homesteaded initially by Mr. Biggar in 1901. In 1902, the Biggar family was joined by the Petets. In 1909, Fred Snyder owned the land, but it is unclear who was living on it at the time.

No structural remains are visible at the site. Two cellar-like depressions, a sparse scattering of artifacts, a coal pile and remains of drywall masonry formed the more obvious cultural features at the site. The site is located on an undisturbed rise which was disturbed on all sides at the time of the investigations. A total of 40.25 sq. m was excavated at this site, and 2,099 artifacts were recovered.

While the distribution of artifacts among the various categories is not unlike the trends observed at other sites, the artifact types do suggest a higher standard of living. Household goods and personal artifacts are numerous. Artifacts indicative of the standard of living include several complete alcoholic beverage bottles, electrical items, furnace parts, watch parts, cut glass, and a variety of both elaborate and simple ceramic patterns. Beef cuts include short ribs, blade, chuck, shank, sirloin and brisket. A ham is also represented.

SUMMARY

Mitigation of six historical period sites to be affected by inundation of the Oldman River Dam Reservoir has resulted in the collection of 30,154 artifacts. The occupations of interest date from the late 1800s to the early 1900s and represent settlement, ranching and resource development themes within the overall context of the settlement of southern Alberta. Research is ongoing and is expected to follow a variety of avenues, including comparisons of the assemblages with sites of comparable temporal ranges, a study of socioeconomic status as represented by the sites, chronological indicators in sites with mixed occupations, and architectural information.

THAT DAM ARCHAEOLOGY:
CAMPSITES ARCHAEOLOGY IN THE OLDMAN RIVER RESERVOIR

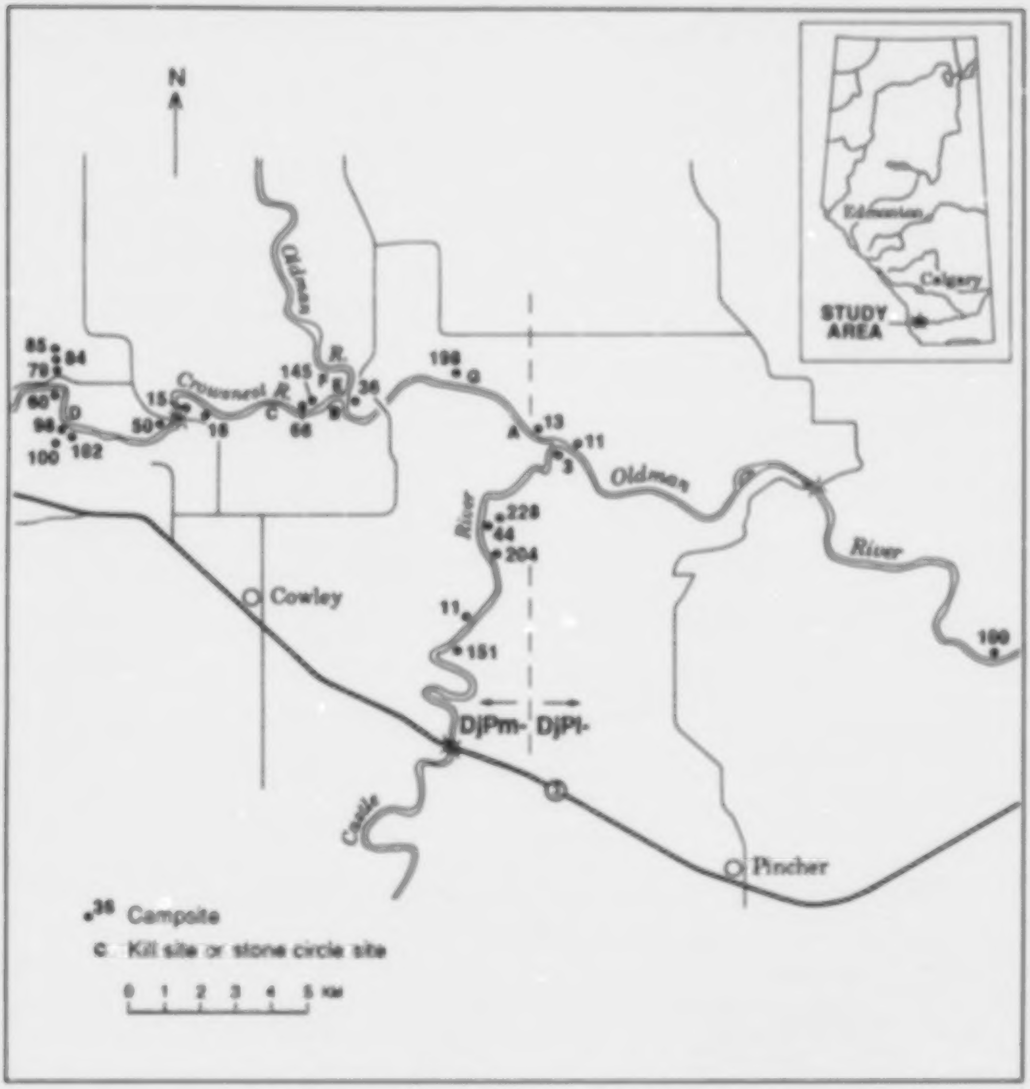
By

Stanley Van Dyke, Sharon Hanna, Wendy Unfreed and Barbara Neal
Bison Historical Services Ltd.

INTRODUCTION

The Oldman River project area lies adjacent to three of the most intensively investigated archaeological areas in southwestern Alberta. It is located centrally along an axis between the Crowsnest Pass and Head-Smashed-In Buffalo Jump, just north of Waterton National Park. Archaeological investigations in the vicinity of the Oldman River project area began more than 25 years ago with studies by Forbis (1960, 1966). In 1985 and 1986, an Historical Resources Impact Assessment of the proposed reservoir was conducted (Reeves 1987). On the basis of these studies, Reeves concluded that this reach of the Oldman River was a major prehistoric wintering area. Studies in support of mitigating impacts to prehistoric sites within the proposed reservoir were begun in 1988. To carry out this work, the Oldman River Dam prehistoric archaeology mitigation program was subdivided into four separately contracted components: a Stone Features component, a kill sites component, a campsites component and a Management component. Each of the component studies was continued for a second year. The summary presented here constitutes the results of the 1988 and 1989 studies at 12 of the 23 prehistoric campsites examined during the program (Figure 5). The 12 prehistoric sites are those which we considered to be the most informative following the 1988 program of studies and therefore were examined further in 1989.

The main research goal of archaeological studies in the Oldman River Reservoir project area was and continues to be the reconstruction of the prehistory of the region. Within this context, the objective of the study was to examine the ". . . long term winter exploitation of bison by plains groups operating from river valleys" (Ives 1988:108). Ancillary objectives include the delineation of settlement and subsistence patterns, the discovery of


N
Oldman R.
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85
84
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C
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145
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E
9
36
198
G
A
13
11
3
Oldman
River
River
228
44
204
11
151
190
DjPm-
DjPl-
Cowley
Castle
Pincher
Edmonton
Calgary
STUDY AREA
36 Campsite
C Kill site or stone circle site
0 1 2 3 4 5 km

Figure 5. Project study area showing campsite locations excavated in 1988 and 1989. Kill site and stone circle locations are indicated by letters: A - DjPm-126; B - DjPm-114; C - DjPm-116; D - DjPm-80; E - DjPm-115; F - DjPm-21; G - DjPm-197.

relationships between this and other regions, and the relationship between the campsites, stone feature sites and kill sites within the Oldman River region (Alberta Culture and Multiculturalism 1987; Ronaghan 1988). The approach to resolving these problems was simplified by the adoption of a standardized methodology characterized by a single classificatory system, a standardized set of lithic material descriptions and a unified database. The development and management of these standards and guidelines was carried out under a separately contracted management component of the project. Each of the individual study components involved in the program were charged with the development of technical data necessary to meet the larger research objectives addressed by the director of the management component.

RESEARCH DESIGN

The approach taken in the campsites component of the study was standardized to the extent that archaeological activities, analysis and reporting were prescribed by a project manager. Artifacts recovered during excavations were described according to a standardized set of attributes and lithic material types. Materials from living floors, features or occupations, were integrated through the use of cultural material units (CMUs). Cultural material units are defined as ". . . broad based, spatial and stratigraphic sorting and grouping categories that the investigator intends to use in the subsequent analysis" (Brumley 1988b:12-13). As used here, the CMU is a construct which integrates basic excavation data (Figure 6). Units, levels, living floors and features thought to contain associated archaeological material are referred to by a single CMU. Similarly, cultural materials intermediate between other CMUs (and presumably mixed) are also referenced by a CMU designation. Thus, cultural material units can be either archaeologically meaningful or insignificant, well defined or poorly defined.

The CMU is a sample of material culture which is readily comparable to the concept of a component in the Midwestern Taxonomic system of classification (McKern 1939). Because of the nature of the Oldman River Dam archaeological project and the large number of sites and occupations investigated, it became apparent that there was a need for a greater range

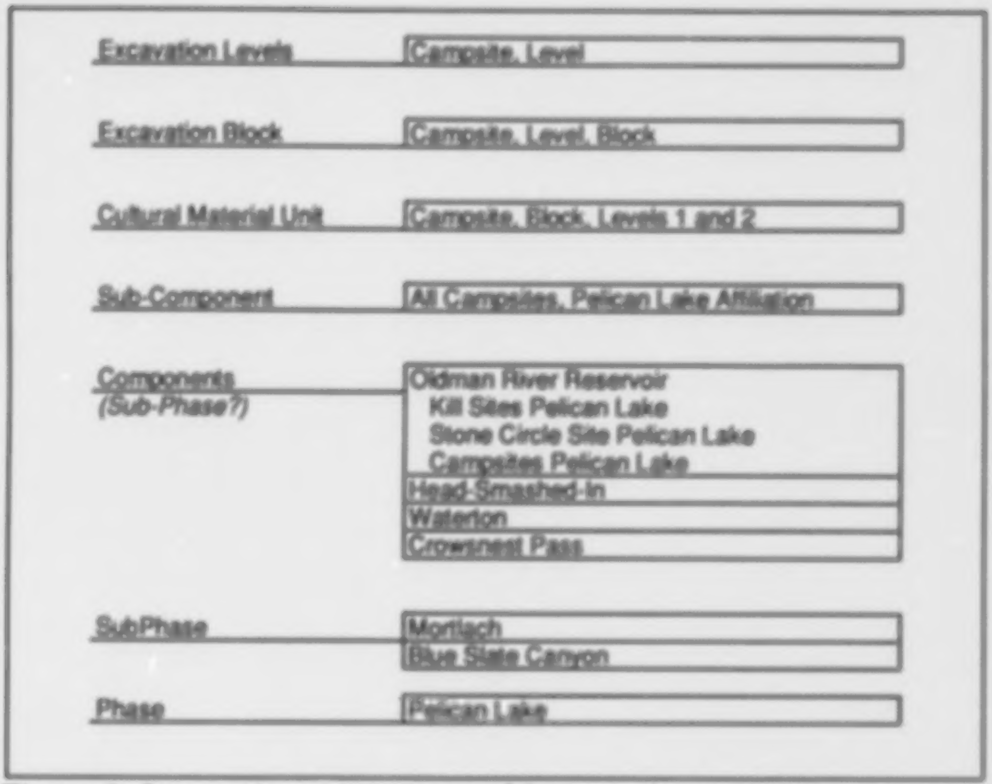
Excavation Levels
Campsite, Level
Excavation Block
Campsite, Level, Block
Cultural Material Unit
Campsite, Block, Levels 1 and 2
Sub-Component
All Campsites, Pelican Lake Affiliation
Components
(Sub-Phase?)
Oldman River Reservoir
Kill Sites Pelican Lake
Stone Circle Site Pelican Lake
Campsites Pelican Lake
Head-Smashed-In
Waterton
Crowsnest Pass
SubPhase
Mortlach
Blue Slate Canyon
Phase
Pelican Lake

Figure 6. Integrative taxonomy used in campsites program.

of integrative classes. As the concept of a subphase has priority in the regional literature (Reeves 1983a), it was necessary to adopt a series of classificatory units intermediate between the subphase and the concept of a cultural material unit.

In our approach, cultural material units are grouped into a "subcomponent"; however, the separation of the Oldman River Dam archaeological study into different tasks (kill sites, campsites and stone feature sites) precludes full integration prior to the completion of the study. Thus, the subcomponents discussed here represent the results of the campsites investigations for particular time periods and cultural affiliations. The term "component," as defined here, is reserved for integrating the combined results of all three archaeological programs. If found to vary significantly from similarly named components within southwestern Alberta, the position of the component, as defined for the Oldman River Reservoir, could be raised to the level of a subphase.

Because of the nature of the archaeological program, subcomponents were defined with various degrees of confidence. On the basis of diagnostic artifacts and 40 supporting radiocarbon dates, subcomponents were attributed to recognized subphases, phases or complexes. Where the data were not clear enough for classification, subcomponents were assigned to general temporal categories on the basis of radiocarbon dates and natural or cultural stratigraphy (e.g., Late Prehistoric, Late Middle Prehistoric, Middle Prehistoric or Early Prehistoric). If a situation occurred where a single CMU lay in stratigraphic proximity to adjacent cultural material units, it was assigned to a mixed class. In addition, a group of CMUs was assigned to an unknown class of occupation. Normally, these included little in the way of cultural material.

The primary objective of the technical study which forms the basis for this paper was the classification of the campsites program data into the groupings noted above. The analytical chore of evaluating sample sizes, comparing frequencies, reclassifying artifacts and other requirements necessary to reconstruct the prehistory of the Oldman River Reservoir and resolve the major research questions were beyond the scope of our research component. On the other hand, the completion of our basic task places us in a unique position to make several observations, however premature, about the prehistory of the study area.

Due to the large size of the project, the following summary is not intended to be a comprehensive technical review. It is our intention to synthesize our general observations pertaining to the prehistory of the Oldman River Reservoir project area. Those interested in obtaining more technical information should be aware that, to date, major technical reports have been produced for each of three separate studies in both 1988 and 1989.

THE SITES

The 1989 campsites program focused on 12 prehistoric sites (Figure 5). Three of these (DjPl-3, 11 and 13) are located at the confluence of the Oldman and Castle rivers. Two others (DjPm-44 and 228) are located in Horseshoe Canyon on the Castle River (Figure 7). DjPm-198 is located on the north bank of the Oldman River, east of its confluence with the

Figure 7. View of Horseshoe Canyon and DjPm-44; view is southeast.

Figure 8. View of northwest area of DjPm-36; view is south.

Crowsnest River. The Welsh site (DjPm-36) is located at the confluence of the Oldman and Crowsnest rivers (Figure 8), while the J-Crossing site (DjPm-16) is located on the south bank of the Crowsnest River, west of the confluence. At the upper end of the reservoir, investigations were carried out at DjPm-98 and 100, in Warriner's Coulee, and at DjPm-79 and 84, on Todd Creek.

A major criteria used in separating the various archaeological programs was the elevation of the sites. campsites were defined loosely as those sites within the valley which were thought to have a high potential for evidence of winter occupation. The sites were similar in the respect that all but one were associated with low or intermediate terrace levels. The similarity stops with that observation, however. DjPl-11, DjPl-13 and DjPm-36 are all associated with the north side of the river and are situated in relatively exposed locations. DjPm-44 is tucked neatly into a deeply incised and protected valley of the Castle River. DjPm-16 is located on a relatively high intermediate terrace on the south bank of the Crowsnest River, while DjPm-198 is situated in a similar context on the north bank of the Oldman River. DjPm-98 lies on a small promontory next to the Crowsnest River, while nearby DjPm-100 is situated within a well-protected coulee bottom, away from the river. DjPm-79 and 84 are located on the east bank of a small tributary valley of the Crowsnest River and, while not now generally protected, might have been associated with tree stands in the prehistoric past. DjPm-228 stands out in contrast to all the others because it is situated on a relic mesa-like landform with an elevation equivalent to the surrounding prairie level.

In addition to their geographical dissimilarities, differences between the prehistoric sites are also found in their character and function. The sites range from processing campsites exhibiting dense concentrations of bone (DjPm-100) to those which exhibit only sparse distributions of cultural material (DjPm-16). Many sites showed evidence for surface rings (DjPl-13, DjPm-36, 44 and 100; Figure 9) or buried rings (DjPm-36 and 198, DjPl-11 and 13), while others displayed evidence of intensive processing activities (DjPl-13 and DjPm-36; Figure 10).

The archaeological sites studied also differed significantly in the nature and stratigraphy of their deposits. At DjPm-16, 36 and 44, archaeological deposits extended to a depth of more than 200 cm; however,

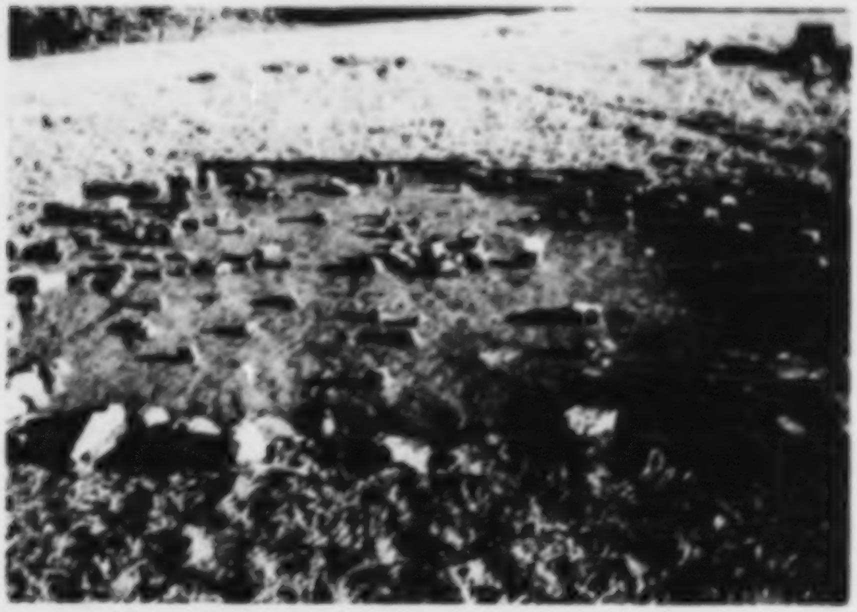

Figure 9. View of protohistoric surface stone circle, DjPm-44; view is north (1989).

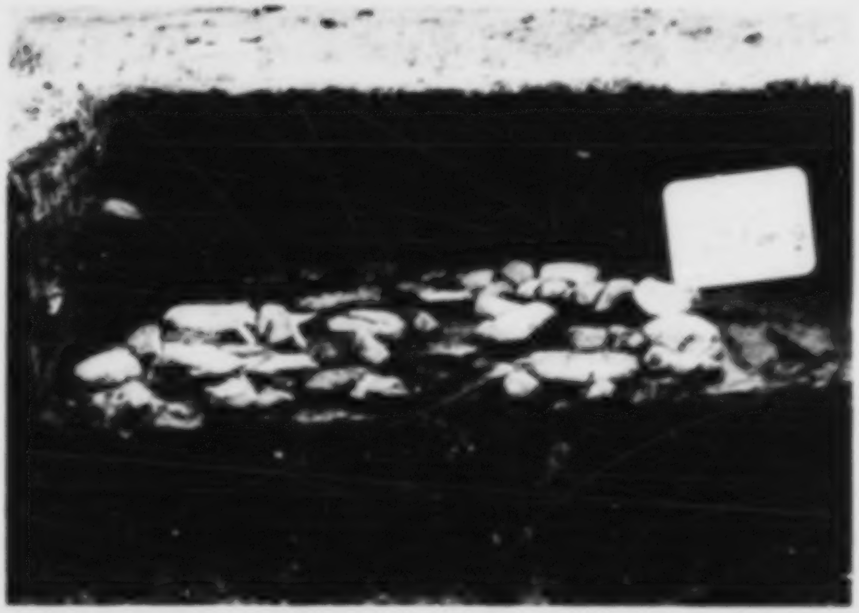

Figure 10. View of roasting platform, DjPl-13 (Pelican Lake); view is south.

these deposits differed in their stratigraphic complexity. At DjPm-16, for example, only a single occupation was defined. The occupation was well separated from other occupations and exhibited no evidence of mixing. Similarly, the Mummy Cave occupation at DjPm-36 was separated from the remaining occupations by more than 50 cm of sterile deposits. The more recent prehistoric past at this site, on the other hand, was confined to a narrow zone of deposits, with evidence for 3,500 years of prehistoric occupation limited to the upper 60 to 130 cm of sediments. Despite these differences, it was found that the lower deposits of most of the sites, which occurred between 130 and 240 cm below surface, range in age from 4,000 to 10,000 years. The last 3,500 years of occupation was confined to the upper 130 cm of deposits at all sites.

Notwithstanding the compressed nature of the stratified archaeological deposits, the integrity of features within the sites was remarkable. Buried stone features, ash pits and other facilities exhibited very little rodent disturbance, although the analysis of the distribution of artifacts suggests that the cultural deposits at the sites had been disturbed. Despite the limited vertical distribution of unmodified rock features, associated artifactual materials occupied 20 cm or even 30 cm of deposits. When the distribution of different classes of artifacts were examined in detail, it was found that they exhibited a complex pattern of vertical distribution. This distribution appears to be the result of a variety of taphonomic factors, including occupational disturbance (e.g., trampling), post-abandonment processes (e.g., wind, vegetation and flooding), and rodent disturbance. Observations to date suggest that the movement of artifacts was primarily vertical, rather than horizontal.

RESULTS

Field studies in 1989 consisted of the excavation of 3,923 levels (1 m x 1 m x 10 cm) at 12 prehistoric sites. In two years of excavation, archaeological studies at these sites have resulted in the recovery of 128,079 cultural items, including artifacts, bone, fire-broken rock and unmodified cobbles. The latter two categories of lithic material were associated with features and compose 24.2% of the cultural assemblage. The remaining

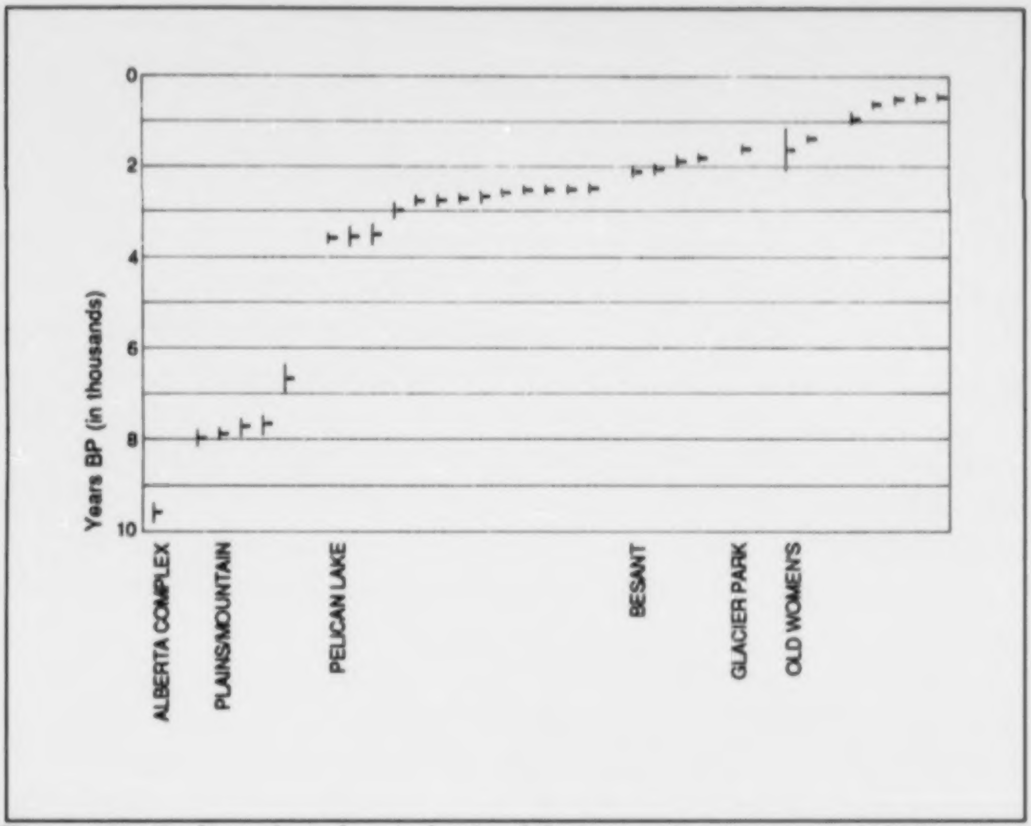

Figure 11. Radiocarbon dates obtained for campsites program (1988).

portions of the cultural assemblage comprise 74,561 pieces of bone (58.21%), 20,551 pieces of debitage (16.05%) and 1,867 tools (1.46%).

The artifacts recovered during our studies were grouped according to CMUs on the basis of diagnostic artifacts, cultural and natural stratigraphy, and 40 radiocarbon dates (Figure 11). In total, 206 CMUs were established. Five of these units (2.42%) were sterile, 32 (15.53%) were of unknown age and cultural affiliation; 24 (11.65%) were found to be mixed; and 145 (70.39%) were assigned to a particular subcomponent classification.

Among the remains, 93.82% of the total of cultural materials (rock, bones, debitage and tools) and 89.83% of those specimens classified as tools were associated with CMUs that were assigned to a specific subcomponent. Where diagnostic artifacts or radiocarbon dates provided a clear indication of an age or cultural affiliation, the subcomponents were attributed to a currently recognized phase or complex (e.g., Old Women's Phase). Eighty-four CMUs (40.78%) were assigned to a specific phase or complex.

Seventy-one other CMUs (34.47%) were assigned to more general units of analysis (e.g., Late Prehistoric, Middle Prehistoric, Early Prehistoric) and are subject to further study.

On the basis of the above, cultural material units were grouped according to eight subcomponents. These include cultural material units representative of a Palaeo-Indian Alberta subcomponent (n=1), a Mummy Cave subcomponent (n=3), a McKean Complex subcomponent (n=6), a well-represented Pelican Lake subcomponent (n=30), a Besant subcomponent (n=7), a poorly defined Avonlea subcomponent (n=6), an Old Women's Phase subcomponent (n=9) and a protohistoric subcomponent (n=6). As well as these eight subcomponents, a series of occupations distinguished by the presence of netsinkers and represented by cultural material units at DjPl-3, 11 and 13 (blocks B and C) was been designated as the "Glacier Park Complex" subcomponent (n=4). Still another occupation, delineated by a well-dated sequence of deposits in the southeast locality of DjPm-36, was identified as a Plains/Mountain subcomponent (7,000 to 8,000 years BP). At present, the Plains/Mountain subcomponent is defined only provisionally, but it is hoped that work proposed for 1990 will provide a more substantive sample.

Among the less specific cultural designations, 33 cultural material units were assigned to the Late Prehistoric Period; 19 cultural material units were assigned to the Late Middle Prehistoric Period; seven cultural material units were designated as belonging to the undifferentiated Middle Prehistoric Period; and ten cultural material units were classified as Early Prehistoric. In the summary which follows, only those cultural material units attributed to a specific period, phase or complex are discussed.

ALBERTA SUBCOMPONENT (9,600 years BP [AECV 746C])

The J-Crossing occupation (DjPm-16, CMU-5) is composed of 2,661 artifacts associated with a buried soil found at a depth of between 220 and 265 cm below ground surface. The palaeosol with which it is associated follows a slope towards the river, and this slope accounts for the extreme variance in the depth of cultural material.

The associated lithic assemblage consists of two projectile points, an Avon chert endscraper, a Swan River chert spokeshave, a purple-brown

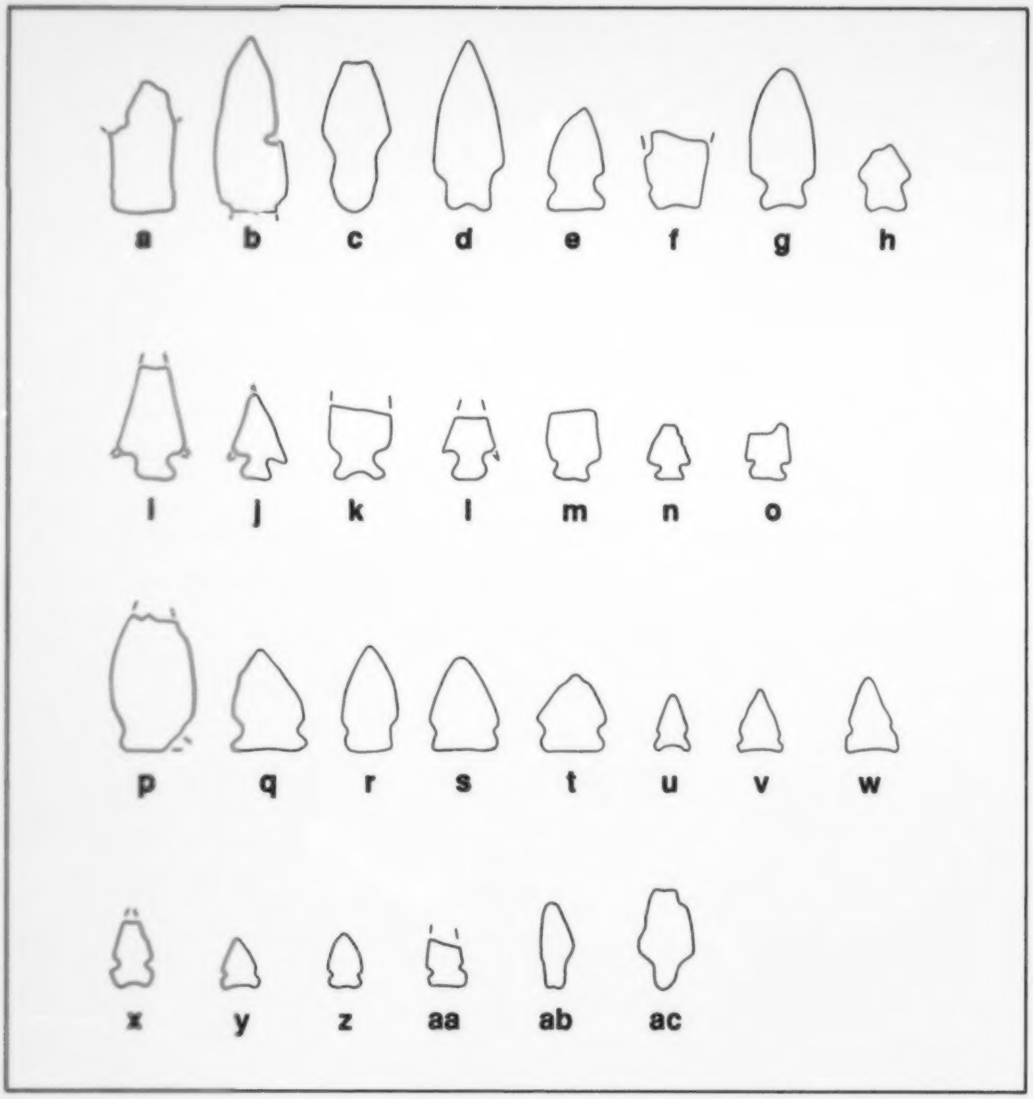
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Figure 12. Representative projectile point specimens (1988 and 1989 program): (a-c) Alberta Complex (J-crossing site, DjPm-16); (d) Plains/Mountain (Welsh site, DjPm-36); (e) Mount Albion Corner-notched (Welsh site, DjPm-36); (f-h) McKean Complex; (i-l) Pelican Lake; (m-o) Pelican Lake; (p-t) Besant; (u-w) Avonlea; (x-aa) Old Women's; (ac-ad) protohistoric (metal).

chert hafted uniface, six retouched flakes, five core tools, two bifaces, an elongate pebble and 1,118 pieces of debitage. One of the projectile points (Figure 12a) is represented by a stem fragment of an unclassified mottled material with bands of red and yellow. The stem is parallel-sided; the base is straight to somewhat convex; and the lateral edges of the stem are ground. One lateral edge exhibits evidence of an expansion of width at the point of breakage. On this basis, the specimen could be classified as a Pryor Stemmed or Scottsbluff point. The second specimen (Figure 12b) is of Top-of-the-World chert. The specimen consists of three pieces, a body fragment and two shoulder/stem fragments. The absence of most of the base prevents us from determining whether the specimen is notched or stemmed. The specimen is tentatively classified as an Alberta point.

A more diagnostic artifact associated with the J-Crossing occupation is a uniface that appears to have been reworked from a projectile point (Figure 12c). The specimen is plano-convex in cross section. The tip and right lateral edge are steeply bevelled. The shoulders are gently rounded, and the stem expands to a rounded base. The specimen is similar in general form to a point from the Lindoe Buffalo Kill (Bryan 1968:74), a point from the Medicine Lodge Coulee site (Bryan 1980:98), points from Lind Coulee (Daugherty 1956) and Parman points (Layton 1972).

The debitage assemblage is dominated by small retouch flakes recovered by fine screening and trowelling. Eight hundred and ninety-five of the specimens are less than 2.5 cm in size and were associated with two flake concentrations observed at the site. The debitage assemblage consists of argillite (n=51), quartzite (n=167), massive quartz (n=2), chert (n=833), siltstone (n=40) and unclassified materials (n=25). The chert assemblage is represented by Knife River Flint (n=3), Avon chert (n=50), Montana chert (n=6), petrified wood (n=5), Swan River chert (n=5), Top-of-the-World chert (n=1), Banff chert (n=1), Etherington chert (n=1), large quantities of black chert (n=399) and miscellaneous chert (n=360). The miscellaneous chert category, as used here, consists of grey, yellow red and red purple cherts.

The associated faunal assemblage is composed of a female bison (MNI=1), rabbit or hare (MNI=2) and a small ungulate (possibly deer). Canid, ground squirrel and undifferentiated rodents were also present. The bison was about 3.5 to 4 years of age and had just reached the age of breeding maturity at the time of her death.

The bison was represented entirely by forelimb elements (radius and carpals). The canids were represented by skull elements, the rabbit or hare by elements from the lower jaw and lower hind limb. The ground squirrels and unidentified rodents, which were probably intrusive in the assemblage, were represented by a variety of body elements. Although no butchering marks were visible, a high percentage of the assemblage exhibited evidence of burning (n=276, 18.17%). The burned specimens included bison and rabbit or hare.

With the exception of two concentrations of debitage, evidence for task-oriented features was limited. A small concentration of three rocks at the extreme south end of the excavation block likely represents the remains of a feature, but no soil staining or charcoal was observed.

A single radiocarbon date is available for the assemblage. The date of 9,600 ± 210 years BP (AECV 746C), from bone, is consistent with the assemblage and stratigraphic context as described. Alberta-type points are reported from the Hell Gap site, where they dated between 9,450 and 8,950 years BP (Irwin-Williams et al. 1973:52). Stemmed points from the Lind Coulee site range from 11,000 to 9,000 years BP, while the Parman specimens from Fort Rock valley (Cowles 1959, in Bryan 1980) were present between 13,150 and 7,300 years BP. In Alberta, a specimen similar to the J-Crossing endscraper was recovered from the Lindoe Buffalo Kill, in association with materials dated to 9,900 ± 120 years BP (S-230) and 9710 ± 190 years BP (GaK-5097). The Lind Coulee series of points is derived from Intermontane/Plateau sites, however, where Alberta points are rare (for occurrences, see Swanson 1961; Swanson, Butler and Bonnichsen 1964; Swanson, Powers and Bryan 1964). Thus, the range of material from DjPm-16 suggests that the assemblage could be assigned to the Windust Phase of the Plateau area as easily as to the Alberta Complex of the Plains.

To summarize, the J-Crossing Complex consists of a small assemblage indicative of a short-term encampment during an unknown season, some 9,600 years ago. The presence and integrity of the two concentrations of lithic material and a small concentration of rock suggests a small, temporary camp. The faunal assemblage, widely distributed as compared to the lithic remains, suggests some duration to the encampment. The diet, as expressed in the faunal assemblage, illustrates a pattern of generalized hunting in contrast to the remains of the Fletcher site, for example. The tool types present suggest a relationship to cultural groups both on the plains and in the interior plateau. The range of material reflected in the debitage suggests that the individuals were a part of system of exchange which included areas from the south, southeast and the Rocky Mountains in the west. The volume of debitage classified as miscellaneous in this assemblage (43.22% of the assemblage) also suggests a pattern of trade or acquisition which is different than that which characterizes later prehistoric groups in the project area.

PLAINS/MOUNTAIN SUBCOMPONENT (6,690-7,890 years BP)

This subcomponent consists of a small, but significant, amount of material recovered from 110 cm of deposits in the central area of DjPm-36 (Welsh site). Cultural materials associated with the complex were recovered from between 100 and 210 cm below surface in the southeast locality of DjPm-36 (CMU-61 to CMU-66). The area in which it was recognized is characterized by complex point bar deposits. An extensive series of backhoe tests in the immediate vicinity revealed the presence of basal gravel at depths ranging from less than 100 cm to greater than 300 cm over a distance of less than 60 m. Mazama Ash, a chronological marker for sediments older than 6,600 years, was observed as a patch at only one location. The sediments associated with the cultural material units assigned to the complex have been dated to the period between 6,690 and 7,980 years BP (five dates obtained). Of particular interest is the occurrence of a projectile point in CMU-63 (Figure 12e) at a depth between 150 and 160 cm, underlying a thin palaeosol dated to 7890 ± 130 years BP (AECV 762C). Associated with the point were a miscellaneous chert retouched flake, five pieces of debitage and 108 pieces of bone. The projectile point displays an overall outline similar to that of Hanna; however, the clear stratigraphic association and range of radiocarbon dates require an alternate explanation. Similar styles can be seen in the Windust Phase (Rice 1972), at Hawkwood (Van Dyke and Stewart 1984), and at the Medicine Lodge Coulee site (Frison 1978). It should be noted that the specimen is not unlike a point from the Paint Rock V site, where it would fall within the range of specimens described as variants of Pryor Stemmed (Frison 1978).

Faunal remains belonging to this subcomponent include bison and canid. Similar to the Alberta subcomponent, a large proportion of bison bone was observed to be burned.

THE MUMMY CAVE SUBCOMPONENT (no date available)

Three cultural material units at DjPm-36 are defined as representing the Snyder Complex (CMUs 9, 12 and 13). The description of the Snyder Complex here is based primarily on the single defined occupation (CMU-12) which lies between 180 and 190 cm below the surface at the terrace edge. CMU-9 and CMU-13 consist of cultural material from just above and just below the occupation. These CMUs contain only small amounts of material and may or may not be directly related to CMU-12.

Material associated with the Snyder Complex (CMU-12) was recovered from 7 square metres of excavation at two locations that were separated from one another by 5 metres. The tool assemblage included a pointed uniface, three endscrapers, a biface, five projectile points, three retouched flakes and three core tools. Two unmodified cobbles were found in association with a lithic workshop area. The single feature recorded in association with this CMU was soil staining found in one block.

The dominant characteristic of the Snyder Complex assemblage was the high frequency of projectile points and debitage. Although most of the debitage (n=2076) was composed of small retouch flakes that were recovered by trowelling, a large number was greater than 2.5 cm in size (n=155). While a significant amount of the material was derived from local sources (e.g., quartzite [n=576]), many specimens were traded into the area from non-local sources. Etherington chert specimens (n=944) and miscellaneous red and purple cherts (n=222) dominated the contents of the workshop. As noted earlier, those lithic artifacts classified as miscellaneous constitute a large percentage of lithic assemblages which date to the Early Middle and Early Prehistoric periods. Although southern chert sources are represented by Montana chert (n=171), Knife River Flint (n=17) and Avon chert (n=2), obsidian, in contrast to the Stampede site, was absent (Gryba 1975). Lithic materials from distant British Columbia sources are also absent (e.g., Top-of-the-World chert), but the presence of Etherington chert from the nearby Crowsnest Pass area suggests a direct relationship to the mountains.

One shoulder/stem projectile point fragment exhibits a shallow, broad notch, rounded shoulder and acute ears. The base appears to be as wide as the body. The minimum stem width is small (1.1 cm). A second shoulder/stem fragment exhibits a similar form, as does a complete specimen (Figure 12f). The two shoulder/stem fragment bases are slightly convex. The complete specimen exhibits a straight base. All appear to be quite short.

Morphologically, the complete projectile point specimens would fall within the range of points conventionally described as Besant. Unfortunately, these same points also show similarities to those identified as Hanna (Reeves 1983a:333). Clearly, the specimens are stratigraphically older than a Pelican Lake occupation, which occurs at less than 130 cm in this area of DjPm-36. The specimens also exhibit a deeper notch than those of Besant. Based on various illustrated specimens (e.g., Walker 1980), the projectile points from the Snyder Complex at DjPm-36 are provisionally classified as Mt. Albion Corner-notched.

The faunal assemblage representing the Snyder Complex consisted of a large canid, an unidentified rodent and a bison. The bison, whose age and gender could not be assessed, was represented by tooth and rib fragments only. The large canid, estimated to be older than 1.5 years of age, was represented by a tibia fragment. Evidence for rodent, which may have been intrusive in the site, was a single incisor.

THE MCKEAN SUBCOMPONENT (3,600 years BP)

Six cultural material units have been assigned to the McKean subcomponent on the basis of stratigraphy, radiocarbon dates or the presence of diagnostic projectile points. A total of 1,691 pieces of cultural material defines the subcomponent; however, much of this total consists of bone (n=702), unmodified cobbles (n=329) and fire-broken rock (n=382). McKean occupations have been defined at DjPl-11 (CMUs 6 and 16), DjPm-36 (CMUs 25, 39 and 41) and DjPm-44 (CMU-8). In each case, the occupations stratigraphically underlie Pelican Lake assemblages. One date is available for this subcomponent. At DjPm-44 (CMU-8), a date of

3,600 ± 100 years BP (AECV 740C) provides an upper bracket for the occupation. A date on a suspected McKean occupation at DjPm-36 (CMU-39) of 4900 ± 130 years BP (AECV 737C) was rejected. Neither of the radiocarbon samples directly dates a projectile point association.

Of the five projectile point specimens in the study area attributed to McKean Complex, two were recovered from DjPl-11 (CMU-6); one specimen was recovered from DjPm-36 (CMU-25); and two specimens were recovered from DjPm-228 (CMUs 7 and 9). However, none of the projectile points dating to the McKean Complex has been classified as McKean points. Later variants (Duncan and Hanna, Figure 12f-h) are present, suggesting that the McKean occupation of the project area was late and may be transitional to Pelican Lake.

The range of tool classes associated with the McKean subcomponent was limited. This suggests brief occupations for summer foraging rather than over-wintering or fall/spring encampments (as is characteristic of the Late Middle Prehistoric and Late Prehistoric periods). Only one biface and two endscrapers were present. An anvil, retouched flakes (n=21) and core tools (n=14) were also found.

The debitage assemblage (n=227) was composed of cherts (n=76), quartzite (n=81) and small amounts of siltstone (n=18), argillite (n=6), obsidian (n=3) and porcellanite (n=1). The small chert assemblage included a wide range of material types. Petrified wood was notably absent. Black chert (n=29), Etherington chert (n=13) and Swan River chert (n=6) were relatively common.

The McKean occupation is also notable as the earliest defined subcomponent in the project area to evidence the presence of modest quantities of fire-broken rock (n=382). It is also suspected that the occupation is the earliest to contain evidence for a stone circle (DjPl-11, CMU-16).

The faunal assemblage from the six cultural material units were also notably small (n=702). Viewed as a whole, the assemblage was essentially limited to bison, primarily scrap and undifferentiated limbs, with a number of teeth, rib fragments and phalanges also represented. The observation made by both Vickers (1986:71) and Reeves (1987:[4-7]) that a broader spectrum of resources was used by McKean Complex people was not supported by the data obtained from the Oldman River project area. To some extent, bone fragmentation and the over-representation of bison observed in assemblages assigned to this subcomponent may be the direct result of extensive butchering and the intensive processing of the bone for marrow extraction and grease production.

The bison represented in these material units could not be assessed for gender, but all were estimated to be older than 2 years of age. At DjPm-36 (CMU-41), in addition to bison, one deer was found to be represented.

To summarize, the McKean occupation of the project area appears to have been minimal. The presence of Hanna projectile points (n=2) and the near absence of McKean projectile points (see Reeves 1987:[4-17]) suggests that the occupation occurred late in the McKean period, between 3,500 and 3,000 years BP. Apparently, the McKean foragers apparently did not use the valley for over-wintering but as a temporary camp in a wider ranging seasonal round. Although the area was part of a sphere of trade which included Montana, deficiencies in common trade items (e.g., Knife River Flint and obsidian) and a predominance of Etherington chert suggests an emphasis on regionally available resources. The general absence of a McKean "culture" in the mountains (see Kennedy et al. 1986) suggests that the seasonal round was limited to the foothills and plains. Given the lack of evidence for bison driving among the McKean people, the valley occupation probably focused on stalking and ambushing bison at fords (Brumley 1975). Both DjPl-11 and DjPm-36 are located near known or suspected river fords.

THE PELICAN LAKE SUBCOMPONENT (2,480-3,600 years BP)

Thirty cultural material units were defined as Pelican Lake on the basis of diagnostic projectile points (Figure 12i-o, radiocarbon dates and stratigraphy. Pelican Lake occupations are present at DjPl-11 (CMU-4), DjPl-13 (CMUs 2, 3, 14, 22 and 23), DjPm-36 (CMUs 6, 31, 33 and 71), DjPm-44 (CMUs 10, 12, 17, 19, 25, 27 and 31), DjPm-98 (CMUs 3 and 4) and DjPm-228 (n=11, various test units). Nine of the cultural material units at DjPm-228 represent Pelican Lake assemblages from small hand test locations. The multiple occurrences at DjPm-36 and 44 represent, in part, assemblages from separate block excavations which can probably be correlated.

Twenty-seven percent of all cultural material recovered during the 1988 and 1989 campsites program can been attributed to Pelican Lake occupations. Buried stone circles associated with a Pelican Lake occupation are present at DjPl-11 and DjPm-98. Unmodified cobbles associated with these and other features appear in substantial numbers (n=1,492). Even more important is a significant increase in fire-broken rock (n=6,959). The faunal assemblage also increases dramatically in size from previous subcomponents (n=19,145). The remainder of the cultural inventory is composed of debitage (n=5142) and tools (n=490). Retouched flakes dominate the lithic assemblage (n=200, 40.8%). Core tools are also represented in large numbers (n=87, 17.8%). Projectile points (n=53, 10.8%), bifaces (n=36, 7.4%), endscrapers (n=47, 9.6%) and unifaces (n=21, 4.3%) also are common. Miscellaneous tools, including spokeshaves (n=4), sidescrapers (n=2), narrow elongate cobbles with pitted ends (n=2) and miscellaneous ground stone tools (n=4), occur in small numbers.

The Pelican Lake occupations are the first to exhibit a wide range of specialized tool classes (e.g., spokeshaves, sidescrapers, endscrapers and gravers) and the first to exhibit ground stone tools.

The projectile point assemblage (n=53) includes 30 dart points; 24 have been identified as Pelican Lake. Undifferentiated side-notched (n=2), stemmed (n=1) and triangular (n=2) dart points are also present. Three Besant points, eight possible arrow points and one Samantha point were also recovered in association with Pelican Lake occupations.

The debitage assemblage includes large numbers of locally available materials, such as quartzite (n=852, 22.3%), argillite (n=315, 6.1%), siltstone (n=353, 6.9%) and black chert (n=486, 9.4%) and, for the first time, exhibits large amounts of obsidian (n=356, 6.9%). The use of Knife River Flint (n=299, 5.8%), Avon chert (n=240, 4.7%) and, particularly, Etherington chert (n=925, 18.0%) increases significantly as compared to the earlier McKean occupation.

The projectile points are made largely from imported lithics. The projectile point assemblage includes specimens of Montana chert (n=11), Knife River Flint (n=7), petrified wood (n=4), Avon chert (n=4) and obsidian (n=4). Fine-grained quartzite, black chert, Etherington chert and purple chert is represented by three specimens each. Coarse-grained quartzite, siltstone and Swan River chert are represented by two specimens each.

Top-of-the-World chert, red chert and argillite are represented by one specimen each. The remainder of the tool assemblage is manufactured largely on local lithics, such as sandstone (n=45) and siltstone (n=41). The most prevalent chert type used for tools is black chert (n=56), which finds expression most often as a retouched flake (n=28) or pebble core tool (n=7). Montana chert (n=47) and Knife River Flint (n=32) are also common. Montana chert is the predominant material for endscrapers (n=10), followed by Avon chert (n=9) and black chert (n=8). Knife River Flint is used typically for retouched flakes (n=15) and points (n=7).

The faunal assemblage indicates that a wide range of resources were used. Exploitation centered on bison; however, deer, canid, sheep, bird, beaver and freshwater molluscs were also represented. As compared to earlier periods, a larger proportion of the faunal assemblage was identifiable by element, possibly indicating less intensive processing at some sites.

The Pelican Lake occupation of the project area marks a major turning point in the use of the valley environment. Bison driving is represented by the presence of a large communal kill site (DjPm-116) – the earliest known for the Oldman River project area (Landals 1989) – and at a campsite which could have been related to a peninsular bison trap (DjPm-228). Boiling pits, hearths, fire-broken rock piles and related facilities are found more commonly and appear to reflect activities associated with an increase in the intensity of bison processing (marrow extraction, etc.). The tool assemblage broadens to include a larger number of specialized tool forms for perforating, cutting, scraping and working skins and bone. Ornamental items (e.g., shell pendants) also appear for the first time. The presence of these materials signals a change in the character and intensity of the occupation which complement Reeves' arguments for a "florescence of the Northern Plains Bison Hunting Culture" (1990:185).

The assemblage composition and locational context of the Pelican Lake occupation suggests over-wintering. It is argued here that the Pelican Lake people are the first group to make significant use of the valley in this manner. According to Landals (personal communication 1990), DjPm-116 represents a major fall kill and is the earliest, if not the only, example of a major kill site in the valley. In contrast, foetal bone at DjPm-228 on the Castle River, then a peninsular trap, indicates that it was used in the spring. In summary, the evidence suggests major fall killing and intensive processing, over-wintering associated with small discrete kills, the spring use of a peninsula trap and the abandonment of the area during the summer.

Eleven radiocarbon dates are available for Pelican Lake occupations in the project area. These range between 2,480 and 3,520 years BP Eight of the dates fall within a range of 290 years (2,480 to 2,770 years BP). The remaining dates include one of 3,000 ± 170 years BP (AECV 741C) at DjPm-36 (CMU-31) and dates of 3,520 ± 210 years BP (AECV 764C) (CMU-12) and 3,600 ± 100 years BP (AECV 740C) (CMU-8) at DjPm-44. The use of the kill site at DjPm-116 and the use of the peninsular trap at DjPm-228 coincides within the recent range of dates (Landals, personal communication 1990).

THE BESANT SUBCOMPONENT (1,610-2,180 years BP)

Seven cultural material units within the project area have been assigned to the Besant Phase. Such occupations have been observed at DjPl-13 (CMU-13), DjPm-36 (CMU-3), DjPm-44 (CMU-6), DjPm-100 (CMU-21 and CMU-25), DjPm-198 (CMU-4) and DjPm-228 (CMU-1). A total of 6,229 pieces of cultural material was assigned to this subcomponent. The majority of the Besant occupations from these sites are associated with living floors characterized by surface hearths, clusters of fire-broken rock and diffuse scatters of unmodified cobbles. Exceptions to this include materials from DjPm-100 (n=201), which are composed of assemblages below the Avonlea occupation and do not form a living floor, and the material from DjPm-228, which is composed of a single projectile point and only a small associated lithic assemblage. The Besant occupation at DjPm-198 contains a buried stone circle.

Three of the Besant phase sites (DjPl-13, 36 and 198) are located on the north side of the Oldman River valley. Only one of these, DjPm-198, occurs in a protected locale. DjPm-44 and 100 in Horseshoe Canyon and Warriner's Coulee are protected. In contrast, DjPm-228 is quite exposed on the top of the mesa-like feature within Horseshoe Canyon. Except for DjPm-228, all of the sites are situated in the valley bottom close to water and well forested areas.

The cultural remains associated with the Besant occupations consist of unmodified cobbles (n=613), fire-broken rock (n=1,393), bone (n=2,609), debitage (n=1,490) and lithic tools (n=123). The tool assemblage is dominated by retouched flakes (n=42, 34.1%), core tools (n=20, 16.3%), projectile points (n=18, 14.6%; e.g., Figure 12p-t) and bifaces (n=16, 13.0%). The chert tools (n=68) are manufactured generally from Montana chert (n=18), Knife River Flint (n=13) or Etherington chert (n=12); however, 35.3% of the chert tools (n=24) are retouched flakes. Petrified wood is rare (n=1); obsidian is absent; and both Avon chert (n=4) and Swan River chert (n=2) occur in only small numbers.

The debitage assemblage is composed of large numbers of quartzite (n=332) and chert flakes (n=941). The ubiquitous black chert is most common (n=314, 3.4%), but Avon chert (n=199, 21.2%), Montana cherts (n=143, 15.2%) and Etherington chert (n=109, 11.6%) are well represented. Petrified wood (n=6, 0.6%) and obsidian (n=4, 0.3%) are rarely found.

The projectile point assemblage from this subcomponent consists of eight complete Besant Side-notched points, one complete Avonlea Side-notched point and two shoulder/stem fragments, which can be classified as Besant. The remainder of the assemblage (two tips, three midsections, a point lacking a tip, a shoulder/stem fragment and a body fragment) cannot be classified.

Three radiocarbon dates are available for the Besant occupations. A radiocarbon date of 2,060 ± 120 years BP (AECV 753C) was secured from a bone sample from DjPl-13, in direct association with a Besant projectile point. For DjPm-44, a radiocarbon date of 1,880 ± 100 years BP (AECV 749C) was obtained from bone. At DjPm-198, a radiocarbon date of 2,120 ± 90 years BP (AECV 756C) was calculated. Aside from these, a radiocarbon date of 1,820 ± 90 years BP (AECV 761C) was assayed from a bone sample found lying immediately beneath a surface ring, in association with a Besant point, at DjPm-44 (CMU-1). A date of 1,610 ± 90 years BP from the Glacier Park Complex (see below) may also be applicable to the Besant occupation and use of the valley.

Faunal resources from this subcomponent resemble those of the Pelican Lake subcomponent and include bison, deer, beaver, small- to medium-sized canid and freshwater mollusc. Bison is represented by a wide variety of elements. Evidence of burned bone was found in most of the assemblages from the sites.

The Besant occupation of the project area appears to have been restricted to a span of time between 1,800 and 2,100 years BP. These dates tend to be somewhat earlier than Besant occupations at the Kenny and Head-Smashed-In sites but are consistent with dates from the Calderwood Buffalo Jump. The Besant occupation appears to have involved over-wintering by smaller populations than Pelican Lake. Evidence from the Stone Features program suggests summer use of the valley as well. At DjPm-21 and 197, stone circle sites on the valley margins, the only diagnostic projectile points were classified as Besant (n=5; Dau 1989). If these represent summer lodges, as the location and paucity of artifactual material would suggest, then the valley was used in the summer as well.

According to Landals (personal communication 1990), no Besant points have been identified in the kill sites program; however, all kill sites during the Late Prehistoric Period, including suspected Besant kills, were composed of smaller, discrete, multiple events. This suggests that, in contrast to Pelican Lake, the Besant settlement and subsistence patterns focused largely on the use of major drives elsewhere in the fall, followed by a dispersal into smaller groups for over-wintering in the many small valleys of the foothills. These smaller populations would exploit scattered bison herds using pounding and similar techniques.

THE GLACIER PARK COMPLEX SUBCOMPONENT (1,610 years BP)

Archaeological studies in 1988 recovered netsinkers from DjPl-3, 11, 13 and 100. The first three of these sites are at the confluence of the Oldman and Castle rivers, on lands of the old Glacier Park Cattle Company. The latter is located on the north bank of a linear reach of the Oldman River, just below Gifford's Coulee and west of the proposed dam site. Because netsinkers are so uncommon in this region, assemblages containing netsinkers were assigned to a separate subcomponent which we have designated as the Glacier Park Complex.

On the plains, evidence of fishing is rare. A site in Calgary yielded evidence of a metal projectile point, fish bone and leister guides in association with a series of four stone circles, but this is thought to represent a transient protohistoric use of the Bow River by mountain peoples (Van Dyke and Maltin 1980). In Saskatchewan, evidence of fishing in the form of fish bone has been recovered from a parklands Avonlea occupation (EeMw-26). This suggests a diverse subsistence strategy for this group (Smith and Walker 1988). In southwestern Alberta, evidence of fishing has been identified previously in Waterton National Park and in the Crowsnest Pass.

At Waterton National Park, evidence for fishing appears at the Narrows site (Milne Brumley 1971). At this site, 16.8% of the artifact assemblage was composed of netsinkers (n=135). These include both chipped and grooved examples. Milne Brumley (1971:98), after Rostlund (1952), states that ". . . sinkers are not required on small hand nets, dip nets or scoop nets but their presence implies large seines or gill nets." As such nets can be quite large, their presence suggests a major commitment to harvesting, which is consistent with the period of fish migration. At Waterton, the migration of whitefish is between September and November, while migration of trout is between November and December (Milne Brumley 1971:99). Thus, intensive fishing could be supported for the four months in the fall.

The netsinkers are reported to occur throughout the sequence at the Narrows site. Diagnostic projectile points recovered from the site range from Early Prehistoric to Late Prehistoric forms. A radiocarbon date of 4,750 ± 160 years BP (GX-1459) on the earliest occupation of the site is available, but inconsistencies in obsidian hydration dating make it impossible to unravel the subsequent use history of the site.

At DjPo-40, situated in the Crowsnest Pass between Blairmore and Frank, Kennedy (1984) reports finding an unusual concentration of eight netsinkers. Associated diagnostic projectile points include reworked Salmon River, Oxbow and Pelican Lake points, while the Besant points recovered with the assemblage were not reworked. Two radiocarbon dates, 1,370 ± 80 years BP (Beta-6308) and 990 ± 70 years BP (Beta-6309), were obtained for the site. These dates barely overlap at three sigma and more than likely represent two events. The association of the Besant points and at least one acceptable date are used to support the age and the Besant cultural affiliation of the occupation (Kennedy 1984:49).

The Glacier Park Complex occupation in the project area is represented by four cultural material units. These are present at DjPl-3 (CMU-8), DjPl-11 (CMU-2) and DjPl-13 (CMU-12 and CMU-21). The netsinker at DjPl-100 was discovered in a small hand test, and, because the site was to be avoided by construction, no further work was carried out in 1989. The excavation of a netsinker at DjPl-3 was highly unusual. The find was made in the upper 10 cm of a rockshelter and was immediately underlain by deposits radiocarbon dated to 4,210 ± 90 years BP (AECV 751C) and 4,360 ± 90 years BP (AECV 757C) from samples of bone. Obviously, the underlying radiocarbon dates do not date the surface (netsinker) occupation. Continued archaeological study at the rockshelter at DjPl-3 in 1989 yielded only three flakes, a seed, a piece of wood and the fragment of a shell pendant.

The Glacier Park Complex subcomponent is represented by 131 unmodified cobbles, 2,624 pieces of fire-broken rock, 2,067 pieces of bone, 1,488 pieces of debitage and 110 tools, two bone tools and three historical items (miscellaneous matter and seeds). The tool assemblage is dominated by retouched flakes (n=47, 42.7%), bifaces (n=17, 15.5%), projectile points (n=13, 11.8%), endscrapers (n=8, 7.0%) and core tools (n=9, 7.8%) but is distinguished by the presence of nine netsinkers (8.2%). Seventy-six of the tools were manufactured from chert (69.1%). These include all of the endscrapers, a drill, 94.1% of the bifaces, 84.6% of the projectile points, 76.6% of the retouched flakes, 50.0% of the unifaces and 33.3% of the core tools. Only the netsinkers are manufactured solely from locally available sandstones and siltstones. The chert projectile points are manufactured from Knife River Flint (n=3, 27.3%), Montana chert (n=3, 27.3%) and Top-of-the-World chert (n=2, 18.2%). Etherington chert, Swan River chert and a mottled chert are represented by one point each. The endscraper series is dominated by Montana chert (n=5, 62.5%), but one each is made of Top-of-the-World, Knife River Flint and black chert. The bifaces include five Montana chert specimens, four each of Etherington and Knife River Flint, two of Swan River chert and one of Top-of-the-World chert.

The chert debitage assemblage is dominated by black chert (n=584, 48.18%), although Montana chert (n=237, 19.55%) is also well represented. Etherington chert (n=94), Avon chert (n=89) and Knife River Flint (n=67) appear in modest numbers. Petrified wood (n=4) and obsidian (n=3) occur infrequently.

Faunal remains from this complex are limited to bison, rabbit or hare, a variety of rodents (which were found in the rockshelter and are probably intrusive) and salmonid (trout or whitefish, at DjPl-13, CMU-21). Generally, bison samples consisted of fewer identifiable elements than noted in previous subcomponents and were limited mainly to unidentified scrap and undifferentiated limb, rib and tooth fragments. Evidence for burning and cutting of bison bone was observed, but in only small quantities.

A single radiocarbon date is available for this subcomponent. The bone sample from DjPl-13 (CMU-12) was recovered from the same unit/level as one of the netsinkers and is believed to date that assemblage directly. A date of 1,610 ± 90 years BP (AECV 758C) was obtained from the sample. A Besant projectile point was recovered from the same level and block (Block B), but a direct association of the radiocarbon sample and netsinker cannot be established positively. In a second block excavation, located 51 m to the southeast (CMU-21), netsinkers and fish bone were found in association with an Avonlea Triangular point, Besant points and unclassified triangular points. The projectile point assemblage for the Glacier Park Complex occupation consists of three Besant, three triangular, one Avonlea Triangular, two Samantha and three unclassified points. Taking our lead from the results of excavations at DjPo-40, a radiocarbon date which overlaps that from DjPo-40 at two sigma, the stratigraphic position of the assemblage and predominance of Besant points, flake points and unclassified triangular points, we think the Glacier Park Complex occupation is culturally related to Besant.

Generally, the Glacier Park Complex occupation of the valley appears to represent a continuation of the Besant occupation. The use of bison, a heavy emphasis on processing of bone for marrow and grease, a high incidence of specialized working tools (e.g., endscrapers, bifaces and unifaces) and a number of similarities in lithic resource selection (e.g., a low incidence of obsidian and petrified wood and a relatively high incidence of Knife River Flint) are shared attributes. The evidence suggests over-wintering or use, at least, during the fall and early winter. In contrast, Kennedy (1984) suggests that DjPo-40, a fishing station, was occupied in the late winter and spring. Ultimately, the key to resolving the season of occupation in the Oldman River project area rests on our understanding of fish migratory patterns. The two fish bone fragments recovered from DjPl-13 have been identified tentatively as Salmonid (either trout or whitefish). If this identification is correct, it would suggest a summer or early fall occupation consistent with the period of spawning. A fall occupation would be consistent with the cultural remains found at the sites, which suggests, through ethnographic analogy, intensive processing of bone for pemmican production.

THE AVONLEA SUBCOMPONENT (1,380-1,630 years BP)

In three decades of research, the Avonlea Phase culture has been defined variously as the ". . . earliest we can accept as evidence for the complex, ritualized, planned bison drives of the Late Prehistoric Plains . . ." (Kehoe 1972:81), a horizon marker (Kehoe and McCorquodale 1961), a culture of Athapaskan origin (Kehoe and Kehoe 1968), and a period that represents a basic continuity with Pelican Lake subsistence patterns and style. The unique consistency in projectile point form over large areas which underlies the horizon concept is no doubt due to trade in finely finished preforms (Dawe 1987) or the rapid spread of a new technology (Reeves 1987). Today, it is customary to accept a Pelican Lake origin. The demise of Avonlea is not as easy to fathom, however. At least one archaeologist has observed, in the record of Avonlea occupation, a process of declining trade in response to stress induced by a decline in buffalo populations. Consequently, this is interpreted as leading to the amalgamation of Besant with Avonlea, in response to a need to increase the home range of each of these groups (Duke 1988).

In stark contrast to the record from Head-Smashed-In, Avonlea is poorly represented in the Oldman River project area. In the kill sites program, no Avonlea occupations have been identified, and only six cultural material units were assigned to the Avonlea subcomponent in the campsites program. Of these, several do not show evidence for diagnostic artifacts but are attributed to this phase on the basis of stratigraphic proximity to Avonlea bearing "levels" or radiocarbon dates. Avonlea occupations are suspected at DjPm-44 (CMU-4 and CMU-21), DjPm-79

(CMU-3), DjPm-100 (CMU-24, related to CMU-19) and DjPm-198 (CMU-2). However, the mixed assemblage from DjPm-100 (CMU-19), discussed below, indicates an Avonlea age and cultural affiliation. All but the CMU-19 assemblage at DjPm-100 are poorly represented in terms of their cultural inventory. The total assemblage, less DjPm-100 (CMU-19), numbers only 3,108 specimens. These include 1,253 bone fragments (40.3%), 928 pieces of fire-broken rock (29.9%), 341 unmodified rocks and cobbles (11.0%) and 82 tools (2.6%). The tool assemblage is composed of core tools (n=36, 45.9%), retouched flakes (n=18, 22.5%), projectile points (n=7, 8.8%; Figure 12u-w), bifaces (n=7, 8.8%), endscrapers (n=3, 3%), a uniface (1.3%) and various miscellaneous items.

Approximately 33.7% of the tool assemblage was manufactured from chert. No obsidian tools and only one petrified wood tool were present. The dominant chert type for tools was an ubiquitous black chert (n=7, 25.9%). Montana chert was represented by four specimens (14.8%). Etherington chert was also present in modest numbers (n=3, 11.1%), and Knife River Flint was found to exist in the form of a single triangular flake projectile point, which could have been intrusive.

The projectile point assemblage is small and consists of only seven specimens. In consequence, it was necessary to rely heavily on stratigraphic correlation to the original hand tests (Reeves 1987) or other sources of information to assign these CMUs to the Avonlea subcomponent. The Avonlea point assemblage includes four complete specimens; one each of Avonlea (possibly Nanton), Avonlea triangular, a flake point and an indeterminate side-notched arrow point. A greater number of Avonlea Side-notched and triangular points were associated with assemblages that could not be assigned with confidence to Avonlea because of possible problems of mixing. Most of these were associated with a single cultural material unit at DjPm-100 (CMU-19, see below). Still two other Avonlea Side-notched points were found in association with occupations attributed to Besant. The associated points were manufactured from Montana chert (n=1), black chert (n=1) and Etherington Chert (n=2).

The debitage assemblage is dominated by argillite (n=215, 42.7%), but most of this material can be traced back to a single lithic work station at DjPm-44 (CMU-21). Clearly, the chert assemblage is dominated by Etherington chert (n=128, 78.5%), but again a single workshop was the source of most of the material. Only two obsidian flakes were recovered, while no evidence for petrified wood flakes was found.

Bison remains dominated the faunal assemblage; however, beaver, canid and deer were found in small amounts at DjPl-11 and DjPm-44. Generally, bison was represented by undifferentiated limb fragments, scrap, ribs and a few carpals. Elements of the hind limb were found in lesser quantities. Burned bone was rarely found with the remains from this subcomponent.

The Avonlea subcomponent, as defined for the Oldman River project area, is small and elusive. The associated projectile points barely warrant mention in the context of Avonlea. Three of the diagnostics were from the upper level of an excavation where the overburden was removed by backhoe. Of the assemblages assigned to Avonlea, only two sparse living floors at DjPm-44 indicate occupation. Much of the real record attributable to Avonlea presently is subsumed within an undifferentiated Late Prehistoric subcomponent which was recovered from DjPm-100 (CMU-19). Only one designated Avonlea occupation is dated. A date of 1,630 ± 480 years BP (AECV 735C) was obtained for a bone sample at DjPm-44 (CMU-4). A date of 1,380 ± 90 years BP (AECV 745C) from DjPm-100 (CMU-19) is also applicable to this subcomponent.

In summary, it would appear that Avonlea use or occupation of the valley was minimal and largely restricted to a processing campsite at DjPm-100.

DjPm-100 (CMU-19)

The lithic and faunal assemblage from DjPm-100 (CMU-19) represents a special case in which it was not possible to separate the Avonlea occupation from an overlying Old Women's Phase occupation. The assemblage consists of 18,958 pieces of cultural material, of which 15,845 pieces (83.6%) are bone. The assemblage is situated in a 20 cm zone of sediments underlying a well-defined protohistoric occupation. Bone is the dominant constituent of the assemblage, which is interpreted as a kill site or a secondary processing area near a kill site. Two radiocarbon dates are available for the assemblage. These dates, 630 ± 80 years BP (AECV 736C) and 1,380 ± 90 years BP (AECV 745C), are consistent with the presence of two occupations. The projectile point series also indicates mixing. This series consists of five Avonlea Side-notched points, three Avonlea Triangular points, five Plains Side-notched points, five Prairie Side-notched points, three unclassified side-notched arrow points, two Besant points, and six unclassified points.

Viewed with the radiocarbon dates, it is argued that two occupations are present, an Old Women's Phase occupation (consisting primarily of a thick bone bed) and an underlying Avonlea occupation (consisting primarily of the stone features and many of the lithics). Bone is also present in association with the Avonlea stone feature and is the source of the earlier radiocarbon date. Unfortunately, separation of the two occupations is impossible. Consideration of the tool and debitage assemblage suggests a clear difference between this mixed assemblage and that of Besant. Similarly, the incidence of obsidian, petrified wood and Knife River Flint in the lithic assemblage indicates a mixing of the Old Women's and Avonlea occupation. The Avonlea occupation of the project area is too poorly understood, however, to allow further discrimination between Old Women's and Avonlea cultural materials. In fact, substantive evidence for the presence of Avonlea in the Oldman River project area rests almost entirely on this one mixed assemblage.

OLD WOMEN'S PHASE SUBCOMPONENT (470-930 years BP)

Nine cultural material units are assigned to this phase. These include a near surface occupation at DjPl-13 (CMU-20), a stone circle at DjPm-44 (CMU-1), a stone circle at DjPm-100 (CMU-15), another surface ring on the lower terrace at DjPm-100 (CMU-18) and a "play lodge" stone circle at DjPm-36 (CMU-18). Cultural material from tests between the stone circles on the lower terrace at DjPm-100 (CMU-23) and situated between 10 and 20 cm below surface was also designated as Old Women's Phase but may contain some minor mixing from a lower Avonlea occupation (CMU-19). At DjPm-36, two other cultural material units (CMUs 52 and 53) were assigned to this phase. Both are poorly defined occupations excavated in the southwest area of DjPm-36 during 1988. Finally, a group of features and a small cultural inventory at DjPm-98 (CMU-1) were assigned to this phase.

A total of 11,733 items was assigned to this analytical unit. These include 642 unmodified rocks and cobbles (5.5%), 2,621 pieces of fire-broken rock (22.3%), 6,576 pieces of bone (56.1%), 1,674 pieces of debitage (4.3%) and 151 lithic tools (1.3%). The tool assemblage consists of retouched flakes (n=51, 33.8%), bifaces (n=27, 17.9%), projectile points (n=29, 19.2%; Figure 12x-aa), core tools (n=23, 15.2%), endscrapers (n=9, 6.0%), unifaces (n=4, 2.6%) and ground stone tools (n=2, 1.3%). Worked bone and shell (n=3), historical items (n=3) and prehistoric ceramic sherds (n=63) were also found. The ceramics were restricted to DjPm-36 (CMU-18) and constitute the only significant sample of sherds from the campsites program.

One hundred and two of the artifacts were manufactured from chert or obsidian. Three bifaces, 13 core tools, 18 retouched flakes and five projectile points were made from locally available argillite (n=2), quartzites (n=17), sandstones (n=10) or siltstones (n=10). One retouched flake was made of basalt, and one projectile point was made from porcellanite. The chert tool assemblage is quite varied. The dominant variety is Montana chert (n=23, 23.2%). Knife River Flint (n=12, 12.1%) and Etherington chert (n=12, 12.1%) are quite common. Eight specimens each of Swan River chert (8.1%) and red chalcedony (8.1%) occur. Petrified wood is represented by seven specimens (7.1%). The miscellaneous chert assemblage consists of ten specimens (1.01%). Five specimens (5.0%) of Top-of-the-World chert and three specimens (2.0%) of obsidian are present . Thirteen specimens (13.1%) of black chert and two green chert specimens (2.01%) were also present.

The projectile point assemblage associated with this subcomponent is composed of Plains Side-notched (Pekisko, n=5), Prairie Side-notched (n=3, two Lewis and one Irving), Plains/Prairie triangular (n=1), unclassified corner-notched (n=1), side-notched (n=4) and triangular (n=2) arrow points and 12 unclassified point fragments. The projectile point assemblage also includes a single possible Avonlea Triangular point which was recovered from DjPm-100 (CMU-23). As noted earlier, this point may be intrusive from an underlying Avonlea occupation.

Projectile points were manufactured preferentially from Montana cherts (n=8, 33.3%). Two were manufactured on petrified wood (an unclassified point and a Prairie Side-notched point), and one was manufactured on obsidian (a Plains Side-notched point). No points were manufactured from Top-of-the-World chert or Knife River Flint.

The debitage assemblage consists of 1,674 specimens, 25.2% (n=422) of which are composed of locally available materials. Obsidian is represented by only 13 specimens (0.8%). The chert assemblage is dominated by black chert (n=441, 35.4%) and Montana cherts (n=225, 18.2%). Etherington chert also occurs frequently (n=117, 9.4%). Top-of-the-World chert is represented by 19 specimens (1.5%). Petrified wood constitutes only 2.1% of the assemblage (n=26). Knife River Flint is represented by 55 specimens (4.4%).

The faunal assemblage is large and varied, but it is dominated by bison remains (n=6,576, 56.1%). In addition, canid, deer and unidentified bird were also represented. The variety of bones representing bison consisted mainly of unidentified scrap and undifferentiated limb, tooth, vertebrae, rib and phalange fragments. Foetal bone was recovered from assemblages at DjPl-13, DjPm-36, DjPm-44 and DjPm-100. This composed the largest amount of foetal bone collected from any one subcomponent within the campsites program. The presence of this foetal bone indicates use of the project area in the late winter and/or early spring.

The identification of an Old Women's Phase occupation in the project area is supported by a projectile point series and five radiocarbon dates. Two radiocarbon dates are available for the Old Women's Phase occupation at DjPl-13: 470 ± 80 years BP (AECV 748C) and 500 ± 110 years BP (AECV 747C). The stone circle on the upper terrace of DjPm-100 has been dated to 930 ± 130 years B.P (AECV 734C). A radiocarbon date of 630 ± 80 years BP (AECV 736C) on an undifferentiated Late Prehistoric occupation at DjPm-100 (CMU-19) and a date of 530 ± 80 years BP (AECV 769C) on a feature assigned to CMU-4 at DjPm-84 are also applicable to the Old Women's Phase occupation.

The cultural inventory for the Old Women's Phase subcomponent is dominated by features and tool kits associated with stone circles which are present at DjPm-36, 44 and 100.

In the 1988 kill sites program, Plains Side-notched points were recovered from DjPm-100, 114 and 126 (Landals 1989). The lowest occupation at DjPm-126 is represented by a campsite with significant quantities of ceramics and a Plains Side-notched point association. Although DjPl-13 is located immediately opposite DjPm-126, a late Old

Women's occupation was not defined for the former. Present indications suggest that the Old Women's Phase occupation of the project area was for over-wintering.

THE PROTOHISTORIC SUBCOMPONENT (no date available)

The protohistoric subcomponent is represented by six cultural material units from three prehistoric sites (DjPm-44, 84 and 100). The cultural material units at DjPm-84 (CMUs 3 and 4) consisted of small assemblages, one of which contains a metal projectile point (Figure 12ac). The assemblage from DjPm-44 (CMU-2) was marked by the presence of a metal projectile point and the presence of a metal file situated below one of the hearth rocks. The assemblages from DjPm-100, two stone circles (CMUs 16 and 17) and areas between the rings (CMU-22) included a metal projectile point (Figure 12ab), a variety of beads (bone, shell and blue glass), fragments of a European clay pipe bowl, a metal axe, and buttons of both shell and bone. In addition to the metal projectile point, the projectile point collection representing the protohistoric subcomponent includes Plains Side-notched points (n=7), two Plains triangular points and unclassified corner-notched flake point. Of the four complete Plains Side-notched points, two have been classified as Washita, one as Paskapoo and two as Pekisko.

Cultural materials assignable to the protohistoric occupation include 432 unmodified rocks and cobbles (3.5%), 595 pieces of fire-broken rock (4.9%), 10,581 pieces of bone (86.7%), 489 flakes (4.0%), 73 lithic tools (0.6%), one bone tool (0.01%) and 32 (0.3%) historical items. The tool assemblage included 11 projectile points (one metal and ten lithic, 9.4%), seven bifaces (6.6%), six endscrapers (5.7%), six unifaces (5.7%), core tools (n=20, 18.9%) and retouched flakes (n=22, 20.8%).

Seventy-three tools were manufactured from stone, mainly chert (63.1%). The chert specimens include nine of the ten projectile points, five of the six endscrapers, 16 of the 22 retouched flakes, six of the seven bifaces, six of 20 core tools and four of six unifaces. Only one obsidian tool, a projectile point, was recovered. Montana cherts were used preferentially in the manufacture of tools (n=14, 19.2%), with Etherington chert (n=8, 10.9%), Swan River chert (n=5, 6.8%), Knife River Flint (n=4, 5.5%) and miscellaneous cherts (n=4, 5.5%) also appearing frequently. The nine chert projectile points were made from Montana chert (n=3), Swan River chert (n=2), Avon chert, black chert, petrified wood and a miscellaneous chert (one each). Top-of-the-World chert is represented by a single core tool.

The debitage assemblage is dominated by chert (n=318), with most non-chert specimens being represented by quartzite (n=65), argillite (n=40), undifferentiated, coarse-grained materials (sandstone, n=26) and basalt (n=19). The protohistoric subcomponent exhibits a higher proportion of basalt (3.9%) than all other phase-assigned subcomponents. The chert assemblage is dominated by Etherington chert (n=128, 40.3%). Petrified wood occurs frequently (n=53, 16.7%), along with Montana chert (n=36, 11.3%) and Swan River chert (n=30, 9.4%). Top-of-the-World chert occurs infrequently (n=5, 1.6%). Knife River Flint occurs in modest numbers (n=18, 5.7%).

Activities expressed in the features associated with the protohistoric occupations indicate over-wintering. The metal projectile point at DjPm-84 was found in a processing area which is probably related to a nearby transitory or small kill; however, the remainder of protohistoric occupations are associated with terrace campsites which include surface stone circles (DjPm-44 and 100) or areas between stone circles.

The faunal assemblage, particularly that at DjPm-100, is varied and includes bison, canid and beaver. A foetal metapodial was present but may be related to the underlying Old Women's Phase occupation. Despite this, a spring occupation is indicated.

The protohistoric occupation of the project area is represented at three of the sites in the campsites program – two over-wintering sites (DjPm-44 and 100) and a kill site (DjPm-84). Evidence from the kill sites program suggest that a nearby site (DjPm-80) may be related to DjPm-100 where a radiocarbon date of 290 ± 160 years BP (AECV 694C) was returned on bone from kill deposits between 37 and 54 cm below surface (Landals 1989:49). The protohistoric age and cultural affiliation of the site is supported by the presence of a single immature radius, identified as horse (*Equus caballus*) (Landals 1989:49). One or two foetal individuals are reported to be associated with the kill. Evidence for seasonality suggest a mid-December to mid-February use of the site (Landals 1990:83).

A metal projectile point and bone (cut by a metal implement) from DjPm-126 also provide convincing evidence for another protohistoric kill site at the Castle Fork (Landals 1990:257). After DjPm-116, this site is reportedly one of the largest kill sites in the valley. It, too, is considered to be a December kill (Landals 1990:265).

In the final report of the Historical Resources Impact Assessment for the project area, Reeves (1987:[3-69]-[3-70]) reports the presence of a protohistoric occupation at DjPm-115, south and west of the Crowsnest ford, at the confluence of the Oldman and Crowsnest rivers. Slab rings, bison bone and historical artifacts were found in association. A radiocarbon date on charcoal from a hearth provided a date of 110 ± 90 years BP (AECV 346C). In 1989, archaeological study at the site resulted in the recovery of a large bone sample representative of bison, deer and canid in association with historical goods, including a copper projectile point and two beads (Dau 1989:[4-132]-[4-133]). Additional studies, carried out in 1989, revealed an extensive series of protohistoric goods and evidence for a wide range of features (Loveseth, personal communication 1990).

In summary, the protohistoric occupation of the project area appears to have been extensive. Given the short span of time assigned to the Protohistoric Period (± 150 years), the presence of three well-defined campsites (DjPm-44, 100 and 115) and two significant kill sites (DjPm-80 and 126) is indicative of an intensive use of the valley. The size of kill sites is reasonably large (Landals, personal communication 1990). The kill site at DjPm-80 (a large kill) is represented by an MNI of 16 animals, while the protohistoric subcomponent at DjPm-126 (a communal kill) is represented by an MNI of 23 animals (Landals 1990). Campsites, on the other hand, tend to be relatively small, containing nine stone circles at most. Landals (personal communication 1990) suggests that the increase in the intensity of use for the valley during the protohistoric may be somehow related to the adoption of the horse.

All available evidence suggests a December to early spring use and occupation. Lithic utilization patterns suggest involvement in a system of exchange which included Montana and North Dakota to the south but seasonally at least, focused on the Rocky Mountains to the west (Etherington and Top-of-the-World cherts). Patterns of lithic resource selection exhibit continuity with the Old Women's Phase. Resources used include, minimally, bison, deer, canids and beaver.

CONCLUSIONS

The archaeological record as derived from two years of study of prehistoric campsites in the Oldman River reservoir offers a unique basis for comparison to similar large scale data sets developed for Waterton National Park, the Crowsnest Pass, Head-Smashed-In and a variety of other river valleys within the region. These data are supplemented by individual kill site (e.g., the Pincher Creek Jump) and campsite excavations (e.g., the Kenny site) in the surrounding regions. The archaeological record spans almost 10,000 years and represents most cultural affiliations which have been identified in southwestern Alberta. The archaeological record, as summarized briefly in this paper, largely parallels the record developed for Alberta's northern plains, but nonetheless it exhibits enough variation to whet the appetite of even the most conservative of investigators.

The broad similarities of the Oldman River archaeological record to the remainder of the northern plains reflect the spread of technology, systems of social integration, and modes of exploitation and production. A significant bias towards the hunting of bison characterizes all time periods (Figure 13); however, the introduction of the dart point for use with the atlatl and the arrow point for use with the bow and arrow signal major transitions throughout the plains. The first appearance of stone circles and medicine wheels, less than 5,000 years ago, is contemporary with new systems of food processing, namely the adoption of and increasing reliance on pemmican (Reeves 1990). The success of pemmican use might have led, in turn, to more intensive use of major kill sites throughout the region. Together, these changes were singularly dramatic and are unequalled in terms of their consequences by any other change before the adoption of the horse, approximately 225 years BP. Fortunately, these changes are highly visible in the archaeological record.

In the valley of the Oldman River reservoir, these changes are reflected clearly in the archaeological record. Beginning in Pelican Lake times, 3,500 years ago, use of the valley intensifies remarkably. Rings,

	PROTOHISTORIC	OLD WOMEN'S	AVONLEA	GLACIER PARK	BESANT	PELICAN LAKE	McKEAN	MUMMY CAVE	ALBERTA
Bison	●	●	●	●	●	●	●	●	●
Foetal	●	●				●			
Deer	●	●	●	●	●	●	●	●	●
Canid	●	●	●		●	●		●	●
Ground squirrel	●	●		●	●	●		●	●
Beaver	●		●		●	●			
Shell	●	●			●	●			
Bird	●	●				●			
Rabbit				●		●			●
Wolverine	●								
Elk		●							
Fish				●					
Sheep						●			

Figure 13. Subcomponent faunal representation (1988-1989).

processing sites, spring use of the valley, over-wintering, major bison jumps and peninsular kill sites, a broadening of resource base and a host of related changes are evidenced together and for the first time. The nature of the sites contrasts sharply with the archaeological record of highly nomadic peoples which characterize the valley for the previous 5,000 years.

The archaeological record also exhibits considerable variation with surrounding regions. No doubt this variation is due to the role of the valley in the diverse patterns of exploitation and settlement which have characterized individual populations. The variations in the archaeological assemblages do not pose as many questions, however, as they do

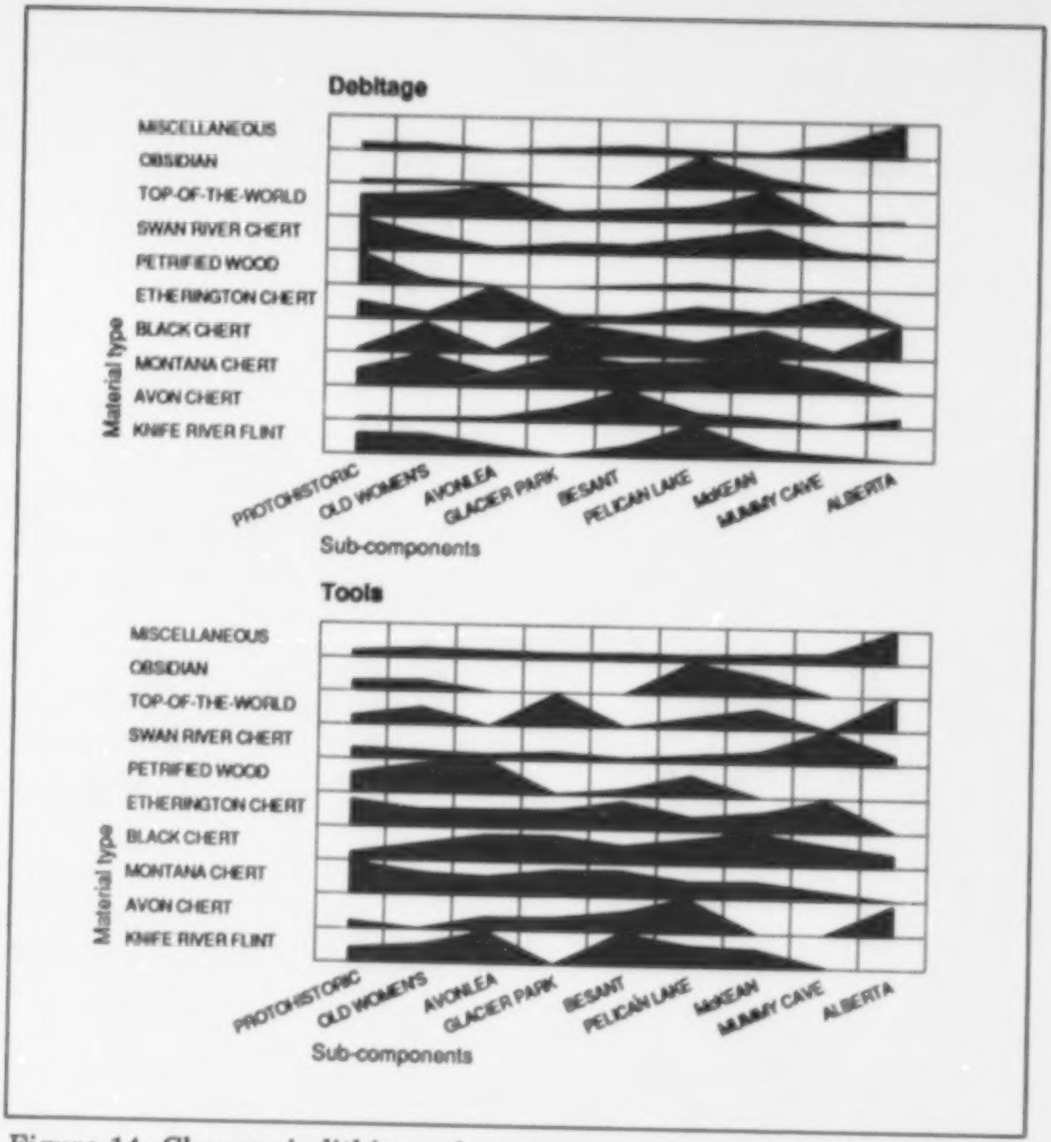

Figure 14. Changes in lithic use by campsite components (1988-1989), debitage above, tools below. Percentages are standardized to maximum for each subcomponent.

possibilities for answers left unasked. Patterns of lithic use (Figure 14), as another example, point to the better understanding that such variation offers. It has been all too easy to identify a cultural affiliation, in part, by the materials they use. Thus, Knife River Flint might become intimately associated with the definition of Besant or obsidian with Pelican Lake. In fact, variant patterns may just be the result of seasonal or social access to these resources.

Although the loss of these prehistoric resources is untimely, our knowledge of southwest Alberta prehistory has been enriched greatly by the results of the first two years of comprehensive study in the Oldman River project area – studies which probably would never be attempted on an ad hoc basis. The integrative and interpretive final report of the Oldman River project by the Director of the Project Management group, continuing studies at Head-Smashed-In, studies of downstream campsite and processing sites such as the McLeod Junction site (DkPi–2), studies of surrounding kills (Pincher Creek Jump) and campsites (Todd Creek) will improve immeasurably our understanding of the regional prehistory – *Real Oldman Country* – in all its complexity along *Napi's River*.

POSTSCRIPT

The 1990 archaeological study of the Oldman River project area is well under way. Required studies in the northwest area of DjPm-36, at DjPl-11 and at DjPl-13 have been completed. Excavations of the Mummy Cave occupation have yielded additional diagnostic projectile points, a series of small tools and additional lithic workshop areas. Studies at DjPl-11 have uncovered an additional netsinker and additional evidence of an early ring occupation believed to be Hanna in age. Extensive studies at DjPl-13 have increased our sample of the Glacier Park complex and the earlier Pelican Lake occupations substantially. Surprisingly, studies in the central area of DjPm-36 have yielded evidence for a major kill site believed to be as old as 7,800 years, in association with a campsite occupation originally defined in 1988. Two additional specimens of a form, referred to elsewhere as Pryor Stemmed, have been recovered.

ACKNOWLEDGEMENTS

Archaeological studies in the Oldman River Reservoir were supported by Alberta Environment (1988) and Alberta Public Works, Supply and Services (1989), who also provided assistance in obtaining a large series of radiocarbon dates. We would like to thank Ron Middleton of PWSS for his continued assistance to the various project components. We are grateful to Brian Ronaghan of Alberta Culture and Multiculturalism for his assistance in the management of the sites and for his general support for our recommendations. We would also like to thank Rod Vickers of Alberta Culture for his thoughtful comments and editorial notes of this paper. Dave Hay (PWSS) was of considerable assistance in the conduct of the field project. We greatly appreciate Alison Landals for her useful discussions concerning the ongoing results and interpretations arising out of the kill sites program and for her comments on this paper. Finally, we would like to thank the more than 20 crew members and a large number of volunteers who were involved in the project during 1988 and 1989. Several of these people are back for a third year.

I would also like to express my sincere appreciation to Sharon, Wendy and Barbara for their work in the preparation of the technical report on which this paper is based and for their comments and assistance in the preparation of this paper.

OLDMAN RIVER DAM KILL SITES MITIGATION, 1988-1989

By
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INTRODUCTION

Fieldwork for the Oldman River Dam kill sites mitigation program was conducted by Environmental Management Associates during the summers of 1988 and 1989. The field program is largely complete, although two sites (DjPm-24 and 116) are scheduled for further excavation in 1990. The vast quantities of data generated from the first two seasons of fieldwork have undergone base level analysis; however, interpretive studies and synthesis are still at a preliminary stage. The structure of the overall mitigation program for the Oldman project is such that most of the synthesis of kill site data with the data from other project components, such as campsite mitigation and surface stone circle mitigation, will be undertaken by the project manager (John Brumley of Ethos Consultants) after project completion.

It is my intention in this paper to discuss the kill sites field program only in terms of the findings to date and to consider some of the preliminary interpretations suggested by these findings. The kill sites field program already has generated a large database that will stand as an invaluable research tool for reconstructing prehistoric subsistence patterns in this area of southern Alberta for many years to come. This discussion is meant to summarize that database and present ideas for generating further research.

THE PROJECT

Eighteen sites were excavated as part of the kill sites field program (Figure 15), with sample sizes ranging from 8 to 80 sq. m. (Details of sample sizes and excavations may be found in the permit reports [Landals 1989, 1990]). In addition, over 120 backhoe tests were completed on selected landforms in order to test for previously undiscovered sites or to define the

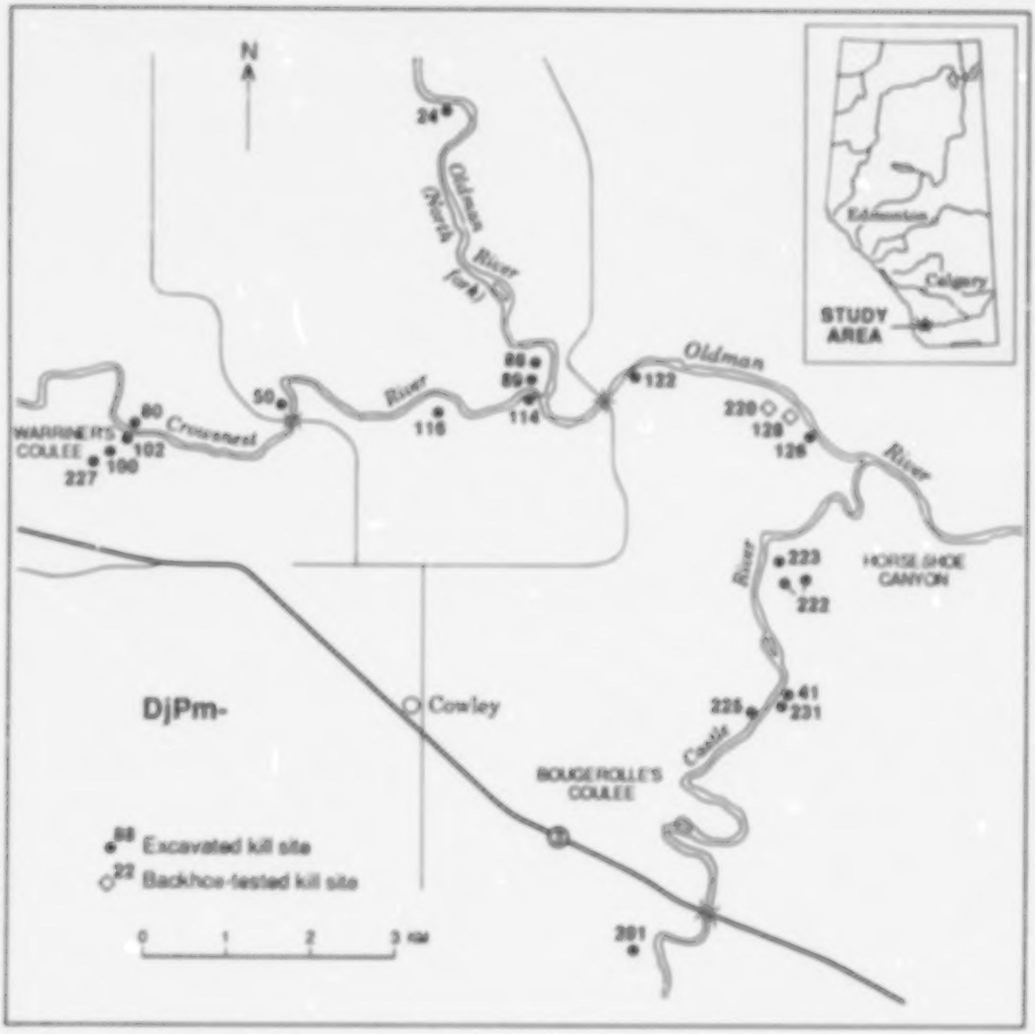

N
24
Oldman (North River fork)
Oldman
River
Crowsnest
River
WARRINERS COULEE
80
102
100
227
50
116
88
89
114
122
220
128
126
River
HORSESHOE CANYON
223
222
River
41
231
225
Castle
BOUGEROLLE'S COULEE
Cowley
DjPm-
88 Excavated kill site
22 Backhoe-tested kill site
0
1
2
3 km
201
Edmonton
Calgary
STUDY AREA

Figure 15. Site locations, 1988-1989 Oldman River Dam kill sites program.

extent of known sites. The backhoe program provided key data pertaining to site formation and geomorphology of the study area. Thirteen new sites (or previously unknown components within known sites) were discovered. These included a Late Prehistoric/Protohistoric buffalo jump (DjPm-80), a pre-Mazama ash component in a site above the full supply level of the dam (DjPm-227) and an Early Prehistoric campsite (DjPm-16; Van Dyke et al. 1989).

As a result of the largely exploratory nature of the kill sites field program, several sites or components containing buried stone circles or other campsite indicators, such as hearths or lithic scatters, were encountered. Although several of these sites/components are of interest, they will not be considered in detail here. Worthy of mention, however, is the campsite component of DjPm-126, the Castle Forks Buffalo Jump. This occupation, stratigraphically lower than the kill deposits, contained a buried stone circle with well-preserved faunal remains and numerous ceramic sherds, perhaps from as many as five different vessels (Steinhauser 1990). A Late Prehistoric (Old Women's) cultural affiliation was indicated by diagnostic projectile points. Other campsites with well-preserved faunal remains provided interesting data regarding seasonal use of non-bison fauna, notably migratory birds, as a food source (e.g., DjPm-122).

Almost all of the excavated sites were dated by the presence of time diagnostic artifacts, radiocarbon dates, or both. The numerous radiocarbon dates obtained for specific landforms and terrace levels, in combination with familiarity with the landforms gained by the extensive backhoe testing, provided an excellent basis for estimating the age range of components for which dates were unavailable. All sites excavated as part of the kill sites field program are Late Middle Prehistoric or younger in age. Only two archaeological phases are represented in kill sites by diagnostic projectile points: Pelican Lake and Old Women's.

The sites examined in the kill sites study vary a great deal in terms of size and cultural affiliation. Only one site, DjPm-116 (the Smyth site), may be considered a "typical" plains large-scale, communal bison kill, to which groups of people returned on a regular basis, likely in the fall, over a period of years to kill large numbers of animals. Another large communal kill site, DjPm-126 (Castle Forks Buffalo Jump), is interpreted as a single event which produced a large bone bed. The isolation of a single communal kill event is of great interest, due to the rarity of such sites (Frison 1987:181). The other sites, with the exception of DjPm-80, are much smaller in scale when regarded individually, but when taken together they offer important insights into subsistence and settlement models. In the following sections, each of the larger sites will be considered in some detail, and the smaller sites will be discussed as a grouped category.

DjPm-116 (THE SMYTH SITE)

The Smyth site is the largest and most significant kill site in the project area; consequently, it was be the major focus of the 1990 kill sites field study. Because of the sheer quantity of faunal remains, the incomplete analysis of faunal material and the incomplete state of the field program, much of the following discussion is preliminary in nature.

The site is located on the south side of the Crowsnest River on a low, flat, north facing terrace at the base of a much higher, steep glaciofluvial terrace (Figure 16). Backhoe trenching at the site has revealed that the Crowsnest River once cut against the base of the glaciofluvial terrace in a sharp meander but has since migrated northwards. After the river began to cut north, the abandoned channel at the base of the high terrace became the focus for communal bison driving activities. It is unclear at the present time (and far beyond the scope of this paper) if a jump, series of pounds or combination of techniques was the method of kill.

Based on excavations to date, the remains of as many as 4,000 bison may be present in the large bone bed at the base of the terrace (Figure 17). Depth of the bone bed varies depending on relation to the slope and colluvial mantle, but all bone is deeply buried (150-230 cm below surface). Three samples from different areas of the bone bed returned closely overlapping radiocarbon dates: 2,220 ± 110 years BP (AECV 344C), 2,290 ± 100 years BP (AECV 867C) and 2,650 ± 140 years BP (AECV 868C). A total of 51 projectile points has been recovered from the bone bed to date, and all identifiable points have been classified as Pelican Lake Phase forms showing a high degree of consistency.

Over 40% of the points are manufactured from Kootenay Argillite, and other western source materials, such as Etherington and Top-of-the-World

Figure 16. DjPm-116, view to the south.

Chert, are also represented. Obsidian is confined to a single point fragment. These material type frequencies stand in sharp contrast to other Pelican Lake Phase campsites in the area, where argillite is never present as the most abundant material type, and obsidian is usually present in higher frequencies (Van Dyke, personal communication 1990).

Faunal analysis is at a very preliminary stage, but the rudimentary dentition studies suggest a fall season for most use events. In some areas of the bone bed, it is impossible to separate levels based on vertical stratigraphy, although in others (e.g., excavation blocks A and B) evidence for at least two separate, superimposed Pelican Lake components was isolated. Horizontal differences across the site suggest that the bone bed is not a single, amorphous entity but may preserve evidence in different areas for various sets of prehistoric processing decisions. A large processing area around the main bone bed area has been identified, as was a possibly contemporaneous campsite to the west of the kill. These areas were investigated in detail in 1990, but the results have not yet been analyzed fully.

In summary, evidence from the Smyth site suggests that very intensive communal bison driving occurred at the site but only during

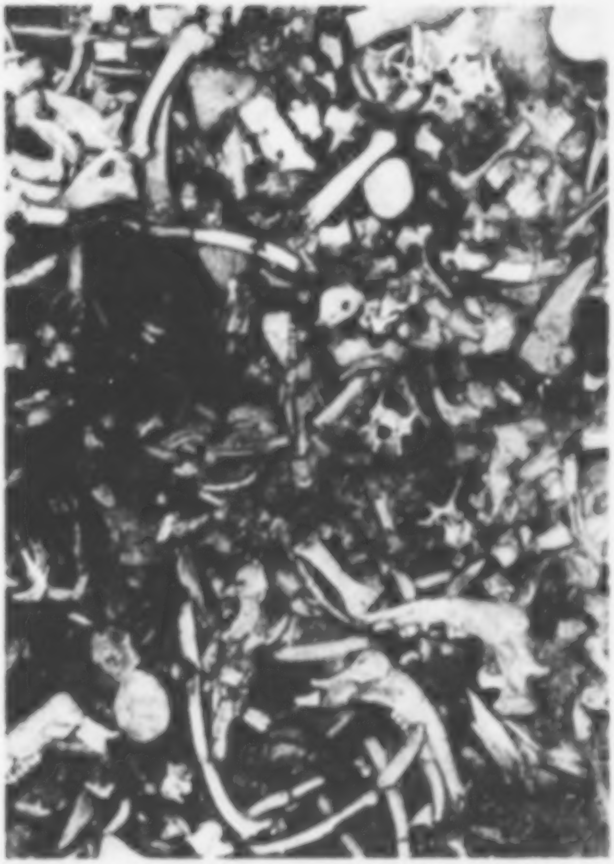


Figure 17. Detail of bone bed, DjPm-116.

Pelican Lake times. Site geomorphology precluded use of the landform for communal driving much before Pelican Lake times, and it was not used afterwards. The strong presence of exotic lithic materials in the collection is of some interest. In a recent article, Reeves (1990:182) has suggested that the Late Middle Prehistoric Period saw the florescence of the "Northern Plains Bison Hunting Culture." He suggests that this time period saw changes in sociopolitical organization which allowed larger numbers of people to aggregate than previously and that an indication of this increased sociopolitical complexity was the development and maintenance of large and complex lithic exchange networks by Pelican Lake peoples. The Smyth site, considered together with information from the campsites field program, will provide an interesting complementary data set in this regard.

DjPm-126 (CASTLE FORKS BUFFALO JUMP)

Castle Forks Buffalo Jump is located at the base of a steep, northeast facing sandstone escarpment on the south side of the Oldman River just upstream of its confluence with the Castle River. Because of its proximity to the river, much of the site has eroded away leaving a linear exposure of bone in the river cut, some 25-30 m long but less than 3-4 m wide (Figure 18). Virtually all of the extant site area was excavated in 1988 and 1989. As a result, the site sample of 56 sq. m is considered to be highly representative, perhaps in the order of 30-60% of the total original site area.

The dense, well-preserved bone bed has been interpreted as resulting from a single event: an early to mid-winter communal buffalo jump of approximately 40 to 80 animals. (For a detailed discussion, see Landals 1990.) The size of the jump, its location in relation to prevailing winds, the topography of the gathering basin behind the jump and the reported presence of drive lanes (Reeves 1987; unfortunately destroyed by ploughing) all conform to the traditional and expected pattern for a classic plains buffalo jump. Only a single communal kill event is represented; however, the lower levels represent more ambiguous site types or clear-cut campsite activities.

The dating of the kill is interesting, since it represents a time period just at the cusp of the Late Prehistoric/Protohistoric transition. Nine lithic projectile points and one metal projectile point were recovered from the bone bed. The lithic points form a consistent series in terms of material type and form. Six points are manufactured from a good quality, opaque brown chert. Using Forbis' typology from the Old Women's series, as represented in Vickers (1986:98), only seven points could be subdivided into specific types easily. (The remainder were broken or poorly made flake points.) Six points were classified as Pekisko and one as a Washita type, indicating a date towards the end of the Old Women's series. The metal point has been cut from a thin sheet (ca. 1-2 mm) of ferrous metal (iron). It is symmetrical, triangular in overall form, with shoulders that form an acute angle and a narrow, straight stem. Some preserved wood and possibl other organic material pertaining to hafting still adheres to the base, attesting to the excellent preservation and relatively recent date of the site.

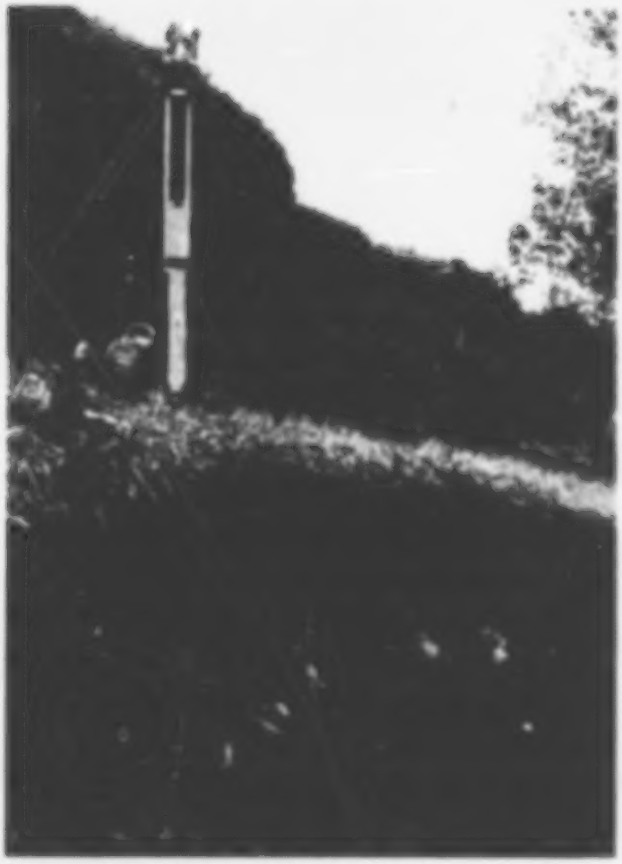


Figure 18. DjPm-126, detail of bone bed in rivercut.

The association of the metal point with the bone bed is firm, since this area of the bone bed is overlain by more than 1 metre of sterile colluvium. The metal point is similar to other points from English fur trade sites (e.g., Noble 1973:148-150). Its presence in a traditional buffalo jump, along with numerous lithic points, likely indicates a date in the last half of the 18th century or early in the 19th century for the site. (For a more complete discussion, see Landals 1990.)

The faunal assemblage is composed of 16,571 items, mainly bison. Non-bison items include a deer phalanx, rodent mandible and the remains of at least two canids. By count, 25% of the assemblage is identifiable to element; by weight, this increases to 94%, broken down as follows: 80% axial, 8% front quarter, 5% hind quarter and 1% lower limb elements. The faunal assemblage shows an interesting butchering pattern, both in terms of element use (e.g., mandible choppers) and element representation. It is not possible to discuss these in any detail here due to the summary nature of this discussion, but in essence the Castle Fork jump represents an extreme example of what Binford (1978) has categorized as a "bulk" butchering pattern or an extremely frugal strategy in which virtually the only elements discarded are those of extremely low utility. The interpretation favoured here is that this resulted from use of horses to pack away meat for "heavy butchering" in the manner described by Wissler (1910:42).

Numerous research questions remain to be addressed. For example, gender analysis was hindered by the lack of limb elements in the assemblage, and seasonality estimates were hampered by the use of mandibles as chopping tools. The Castle Forks bone bed also could provide an excellent sample for a number of other research-oriented studies, such as the degree of bone bed disarticulation (e.g., Todd 1987) or changes in butchering patterns as a result of metal tools and/or the introduction of the horse. The tight series of projectile points (albeit a small sample) might prove interesting in a study of ethnicity (e.g., Greaves 1982).

DjPm-80

DjPm-80 is a small buffalo jump located on the north side of the Crowsnest River, at the base of a high (35 m+) bedrock terrace. A total sample of 59 sq. m resulted in excavation of approximately 80 to 90% of the bone bed; consequently, the sample may be regarded as highly representative.

A bone collagen date of 290 ± 160 years BP was obtained, suggesting a calendar date of 1500-1820 AD. Three small pieces of lead foil found in the bone bed and a fragmentary, immature radius that is tentatively identified as horse suggest a date towards the end of this period. Firm identification of the horse bone remains problematic due to the lack of a comparative specimen of the same age in available collections. Two Late Prehistoric (Old Women's) points were found in association with a small hearth that directly underlays the bone bed and almost certainly is not contemporaneous.

A total of 12,543 faunal items was classified as bison. By count, identifiable elements compose 29% of the sample; by weight, this increases to 95%, broken down as follows: 50% axial, 24% hind limb, 18% front limb and 3% lower limb. The butchering strategy stands in total opposition to that shown in the Castle Forks jump. At DjPm-80, an ultra "gourmet" pattern (Binford 1978) is apparent – only tongues, hump meat, some ribs and likely internal organs were taken. Essentially, the nearly complete skeletons of a minimum of 16 animals were left at the base of the jump, indicating a very small, opportunistic kill event.

Seasonality evidence gleaned from dentition suggests a winter kill; however, the presence of a minimum of three well-developed foetal individuals likely indicates a slightly later date of early spring. Numerous aspects of the faunal assemblage, site formation processes and distribution of the bone suggest that it may have resulted from mounted buffalo jumping such as that described by Fidler for the Peigan. (For further discussion, see Landals 1990.) If this interpretation is correct, the site is representative of the terminal period of Plains Indian buffalo jumping and provides a remarkable and unique archaeological assemblage.

A puzzling aspect of the assemblage was the presence of numerous complete faunal elements (NISP=437) of a minimum of seven canids interspersed with the bison bone. Six of these have been identified as large dogs or possibly wolf/dog hybrids, most likely the former (Krozser 1990, this volume). While traces of canid bones almost can be considered ubiquitous at sites in this area and at plains kill sites in general, the DjPm-80 sample, with an MNI approaching 50% of the bison MNI, is highly anomalous. (For further discussion see Krozser 1990; Landals 1990.) For other researchers interested in studying prehistoric canids in the northern plains, the DjPm-80 canid assemblage will provide an important primary source because of its size and the presence of a presumably related population of different ages and genders.

TRANSITORY KILLS

With the exception of the three sites discussed above (and one site, DjPm-24, scheduled for further investigation in 1990) the kill sites excavated in 1988 and 1989 may be classified as small-scale or transitory kills. With the exception of DjPm-89, the only single component site, all of the sites contained multiple levels of bison bone and relatively deep and, in many cases, well-separated stratigraphic layers. A total of 49 "cultural units" was defined within the excavated portions of the above sites. All are represented by small scatters of bison bone, never representing more than three animals and often representing only a single animal. Sometimes the bone exhibits spiral fracture or green breakage patterns; sometimes it is highly weathered. Cultural material, such as a flake tool, cobble chopper or manuport, associates very rarely. Dated levels are all younger than ca. 3,000 years BP, and most are Late Prehistoric in age.

This group of sites is interpreted here as being only partially cultural in origin. Some components likely represent natural deaths or carnivore kills, since it is often difficult to distinguish between natural and cultural agents acting to modify bone in the observed patterns. The type of cultural event that would produce a transitory kill site is envisaged as very small and ephemeral in nature, such as a hunter or small group of hunters encountering and killing one or several animals. Butchering would be undertaken with cutting tools brought with them for the purpose, with bone expediency tools or with simple tools manufactured from convenient cobbles. Butchering could range from removal of choice portions to skinning and extensive dismemberment, but intensive processing activities, such as grease extraction, would not be undertaken. The remains would then be left behind to experience carnivore attrition and/or weathering, leaving little in the way of a cultural record. Such transitory events must have occurred with great regularity in the study area, and evidence for them normally would be destroyed by taphonomic processes.

The Horseshoe Canyon area provides a good example of the widespread evidence for this type of archaeological site in the study area (Figure 19). The abandoned oxbow channel forms a deep, steeply walled, flat-bottomed landform with a complex and variable stratigraphic sequence representing deep, rapid filling of the oxbow by both fluvial and colluvial processes. Backhoe testing and excavations revealed 2-3 m deep profiles characterized by complex sequences of faint palaeosols (or regosols) separated by thick to thin alluvial silts or colluvial layers. Two sites, DjPm-222 and 223, contained a total of nine well-separated cultural units associated with these palaeosols; all are classified as "transitory kills."

Figure 19. View of Horseshoe Canyon.

In addition to the excavations, 22 backhoe tests were completed in Horseshoe Canyon. Only two tests were sterile; the rest contained multiple levels of bone. (For example, one test contained seven sparse but stratigraphically distinct layers of bone.) From this high degree of faunal recovery based on a gross level of testing, it is evident that the Horseshoe Canyon feature must contain thousands of faunal elements relating to numerous past events, likely all dating to within the last 1,000 years.

Without doubt, a proportion of this material must represent carnivore kills and natural deaths; however, the sheltered nature of the canyon, its vegetation and proximity to the river must have combined to make it a favoured ungulate habitat. In winter, dense conifers would have provided shelter during extreme weather conditions. In addition to bison remains, elk, deer, canid and unidentifiable small ungulate remains were recovered from the testing program.

The observed distribution of bone, some of which is clearly culturally modified, is interpreted here as resulting partially from repeated "low-level" use of the landform for encounter-type hunting during the past 1,000 years. Potential for stalking and ambushing game in the area is relatively high, given the nature of the landform, its preferred use by ungulates and correct weather conditions. Such use of Horseshoe Canyon would result in widespread scatters of faunal material both vertically and horizontally across the landform and a correspondingly low representation of such cultural material as fire-broken rock or lithic debitage. Several hunters killing one to a few animals, stripping useable portions and abandoning the remains to be scattered by various taphonomic processes would leave little in the way of physical remains. In a normative depositional situation in southern Alberta, such events would be rendered archaeologically "invisible" within 10 or 20 years. The geomorphology of Horseshoe Canyon (periods of surface stability followed by rapid fluvial and/or colluvial deposition) has resulted in the preservation of a unique, albeit limited record.

Although interesting in terms of their frequency and distribution, small-scale/transitory kill sites afford only limited interpretive potential due to the paucity of cultural remains and difficulty in distinguishing them from natural occurrences. The value of this study has been in recognizing this persistent, recurring pattern in the study area, particularly in relation to such landforms as Horseshoe Canyon. Often such sites are ignored in archaeological studies, even though they provide an important interpretive parameter in terms of regional subsistence and settlement patterns.

Intensive prehistoric use of the study area perhaps should be attributed to a large degree to its twisting, steep walled river valleys, incised coulees, multiple terrace levels, meander scars and abandoned oxbows, all of which would provide excellent opportunities for small-scale hunting episodes. In other words, it might not be just the presence of large numbers of bison which was critical for intensive prehistoric use of the area, particularly in the Late Prehistoric Period, but the opportunities afforded by those particular landscape features that differentiated this area from other areas in southern Alberta.

SUMMARY AND CONCLUSIONS

The Oldman River kill sites mitigation program has resulted in intensive examination of a large number of sites in a restricted geographic locale. Interpretations of the area's prehistory based on the kill sites study alone are almost certainly biased. The dynamic nature of the riverine ecosystem in the foothills environmental zone likely has resulted in large chunks of the prehistoric record (particularly of less recent periods) going downstream with the spring floods. Nevertheless, a few cautious observations can be made.

Within the study area, the only evidence for the kind of large-scale, intensive communal bison hunting that is viewed as the hallmark of prehistoric plains bison hunting cultures is restricted to Pelican Lake times, as evidenced by the Smyth site. The only other large kills are the Castle Forks jump and DjPm-80; both of these are considered to be protohistoric (or very Late Prehistoric) in age. While the Castle Forks jump is certainly a large, "traditional" buffalo jump, in terms of scope, complexity and repeated use, it cannot compare to the Smyth site. The interval between intensive communal hunting in the area during Pelican Lake times and the protohistoric is marked only by very common, archaeologically ambiguous, small-scale/transitory kill sites. Recovery bias and selective loss of key landforms can be invoked, but the answer also may lie in differing seasonal use of the area by subsequent Besant, Avonlea and Old Women's phase peoples, a possibility far beyond the scope of the kill sites study.

Obviously, it is counterproductive to discuss this pattern in isolation from data recovered from other components of the overall Oldman River mitigation study. Discussion with Van Dyke (personal communication 1990) has indicated an interesting and exhilarating synergy with some aspects of the campsites field study, particularly in terms of intensive Pelican Lake use of the study area. The campsites field program, because of its size and the type of data recovered, offers far more scope for reconstruction of regional subsistence and settlement patterns. Taken in conjunction with the surface stone circles program, a more balanced picture of the prehistory of the study area is sure to emerge as the Oldman project moves into the next phase of overall project synthesis and broad-based comparison/interpretation.

CANID REMAINS AT KILL SITES: A CASE STUDY FROM THE OLDMAN RIVER DAM PROJECT

By
Kit Krozser

Canid remains are recovered frequently from kill sites on the plains. Although the minimum number of individuals (MNI) is usually limited to one or two, canids are still the most abundant non-bison species recovered from kill sites. Their presence in kill deposits is seldom explained. Often they are given only passing reference in faunal assemblage descriptions. This paper discusses the presence of canid remains at kill sites in light of an unusually large canid assemblage from DjPm-80, a Late Prehistoric kill site excavated as a part of the Oldman River Dam project in southwestern Alberta, and a more typical canid sample from site DjPm-126 at the same project. Analysis concentrates on species identification and skeletal element representation in order to confirm or eliminate a number of hypotheses.

The presence of canids at kill sites is often attributed to the availability of large amounts of carrion, in the case of wolves, and to the presence of man, in the case of domestic dogs (Walker 1980:165-166). This does not account for all canid remains within kill site assemblages, however, and considering that the purpose of a kill is assumed to be procurement of bison meat and by-products, it seems unlikely that canids would be butchered as well. Thus, there must be other reasons why their remains have become incorporated in the assemblage. Although these problems are usually ignored, a number of explanations, some more plausible than others, have been suggested.

Hypotheses regarding the presence of canid remains at kill sites can be divided into three groups: pre-kill, kill-associated and post-kill. Pre-kill canid presence could be fortuitous, due to natural death of the animal. In such cases, one would expect the skeletal element representation of the canid to be consistent with taphonomic processes. The canid remains should be below or in the lower portion of the bone bed. Most likely, the canid species would be *lupus*, *latrans* or one of the fox genera. Fortuitous presence of canid remains at a kill site depends on a rather large coincidence and cannot account for the frequency of canid remains at kill sites.

Pre-kill canid presence can also be explained by cultural activities, such as a camp at the site prior to the kill. A camp would result in the deposit of such debris as lithic debitage (in quantities greater than those produced by resharpening butchering tools), ceramics, other non-bison faunal remains and structural remains (e.g., hearths), all situated below or in the lower levels of the bone bed. The canid remains should show some evidence of butchering, if only in a selective skeletal element representation pattern other than would be expected to result from non-human taphonomic processes. The canid species most likely would be dog, although it is possible that wild canids were hunted and consumed.

The kill-associated hypotheses also fall into two groups: those related to accidental death of the canids and those related to planned hunting of canids. Accidental deaths of canids could be the result of domestic dogs somehow becoming mixed in the kill event and suffering trauma as a result. Domestic canids could be killed by angry humans because of their interference in the butchering process. This could be considered the "bad-dog hypothesis." Catlin, in describing the butchering scene at a kill site, notes the following:

> I was almost continually amused by the clamorous contentions that arose, and generally ended, in desperate combats; both amongst the dogs and women, who seemed alike tenacious of their local and recently acquired rights; and disposed to settle their claims by "tooth and nail" – by manual and brute force (1973:201-202).

In addition, domestic canids could go over a jump accidentally along with the bison or, more plausibly, could be crushed if they attacked the bison in a pound or below a jump before all the bison were dead (Landals 1986:128). This could be referred to as the "stupid-dog hypothesis." Evidence for such an occurrence might be difficult to identify. Assuming that the animals were not butchered subsequently (an unlikely prospect considering the abundance of meat and immensity of the bison butchering task), the skeletal element representation should be such that it could be explained by taphonomic processes. The canid remains could be distributed within the bone bed or towards the upper or lower portion, depending upon the timing of the "stupid" or "bad" dogs. Since it is unlikely that wild canids would have the temerity to become involved in a cultural event of this sort, the canid remains can be expected to be *Canis familiaris*, although the possibility of domesticated wolves or hybrids cannot be eliminated.

It is also possible that wild canids were killed deliberately by hunters returning to the kill site to catch scavengers gorging themselves on the remains. Lewis and Clark report an incident of this sort:

> The Indians then select as much meat as they wish; the rest is abandoned to the wolves, and creates a most dreadful stench. The wolves which had been feasting on these carcasses were very fat, and so gentle that one of them was killed with an espontoon (Coues 1965, as quoted in Walker 1975:222).

In such cases, the canid remains would be expected to be wolf, coyote or fox and should be located upon or in the upper bone bed layers. Expected skeletal element representation would depend upon whether the animals were being killed for their meat or hides or just for fun. The possibility that wolves were killed for their meat is questionable given the assumed recent acquisition of large amounts of bison meat. It is quite plausible, however, that the lure of the kill site remains would have been taken advantage of in order to obtain canid hides or to hunt merely for sport. In such cases, the skeletal element distribution again could be expected to represent taphonomic processes. If the canids were killed for their hides, skinning cut marks, such as were reported for the Vore and Glenrock canid assemblages (Frison 1970:25; Walker 1980:163), could be expected. At protohistoric kill sites, a further complication in this pattern must be kept in mind. During that period,

> The wolfers operated by poisoning a few buffalo carcasses, then waiting a few days for their victims to devour the carrion and succumb. They were interested primarily in wolves, whose hides were worth a dollar or two apiece; but their mass poisoning also did away with other animals that fed on the carcasses, including coyotes, kit foxes, badgers, vultures, ravens and several birds of prey" (McHugh 1972:279).

Accidental poisoning of feral dogs, wolf/dog hybrids or domestic dogs might occur, in spite of the fact that the wolfers were not necessarily interested in their pelts. As McHugh mentions elsewhere, "If the kill had taken place near an Indian village, packs of dogs would rush out to gorge themselves as well" (1972:86). Under such circumstances, a variety of canid species, wild or domestic, might come to die and be incorporated in the kill site assemblage without necessarily being subject to skinning or any other butchering processes. Their skeletons would be subject to only natural taphonomic processes, and skinning cut marks should be absent.

Finally, canid remains at kill sites could be due to post-kill events (unrelated to the butchering events). This could include, once again, the fortuitous death of a canid – a little more likely this time, given the attraction canids would have to the bone bed. Similarly, canid remains could result from a human campsite in the proximity of the kill site. Subsequent camps would have had to take place well after the kill to avoid the problem of rotting carrion; however, repeated occupations were also commonplace. For example, a group preparing for a kill might use a nearby site repeatedly. Presumably, they would eat whatever was available (including canids) prior to the kill and use the bone bed as a midden. Evidence for both of these post-kill hypotheses can be expected to resemble the evidence for the corresponding pre-kill hypotheses closely, with one exception: in the post-kill hypotheses, the canid remains (and, in the second case, other campsite refuse) might be located on top of or in the upper portion of the bone bed.

CANID REMAINS AT DjPm-80 AND DjPm-126

The evidence for a number of the above-mentioned hypotheses is not mutually exclusive. Successful application to any collection of canid remains and to any particular kill site will depend upon sample size, taphonomic processes, recovery procedures and stratigraphic control. Application of these hypotheses is tested below on two kill sites (DjPm-80 and 126) from the Oldman River Dam project in southwestern Alberta (see Figure 20).

DjPm-80 is a single component kill site located on a low terrace between the north bank of the Crowsnest River and a steep sandstone cliff.

The site consists of a relatively localized bone bed, 2-3 m wide, stretching along the base of the cliff for approximately 20 m. The site contained relatively few lithic artifacts, but two Late Prehistoric projectile points were recovered. Two hearths were located directly below the bone bed. One of these, on the western periphery, probably was associated with the kill event, as evidenced by the large burnt bone elements projecting from the hearth area into the bone bed. A second, centrally located hearth may represent a pre-kill campsite event, since a number of non-bison remains, including ground and waterfowl and skunk, were recovered from the area of the hearth. The charred distal humerus of a very large waterfowl was recovered from the direct vicinity of the hearth. The bison remains (MNI=16) showed little evidence of butchering and may have been subjected to a "gourmet" butchering strategy wherein only selected cuts of meat were removed. On the other hand, the assemblage shows considerable evidence of carnivore scavenging. The faunal assemblage contained an unusually high percentage of canid remains; the MNI of 7 is almost 50% of the minimum number calculated for bison. These remains were recovered from within and towards the upper level of the bone bed. The site has been radiocarbon dated at 290 ± 160 years BP.

DjPm-126 is a multicomponent kill/campsite located on the south bank of the Oldman River. It is situated on a narrow, eroding remnant terrace, 3 m above the river, below a steep sandstone cliff. A small sample of canid remains were recovered from the upper cultural unit, a dense bone bed stretching in excess of 20 m along the base of the cliff. The bison elements showed remarkably little carnivore damage but revealed abundant evidence of butchering, including some cut marks that appear to have been made with a metal knife. Projectile points recovered from this component include Late Plains Side-notched and a single metal point.

SKELETAL REPRESENTATION

While canid remains may be given only passing reference in the archaeological literature, even where bison remains are discussed in detail (e.g., Kehoe 1967:72; Speth 1983:49), canid skeletal representation has considerable significance for interpretation of these remains in the assemblage. For example, a skeletal representation pattern that cannot be

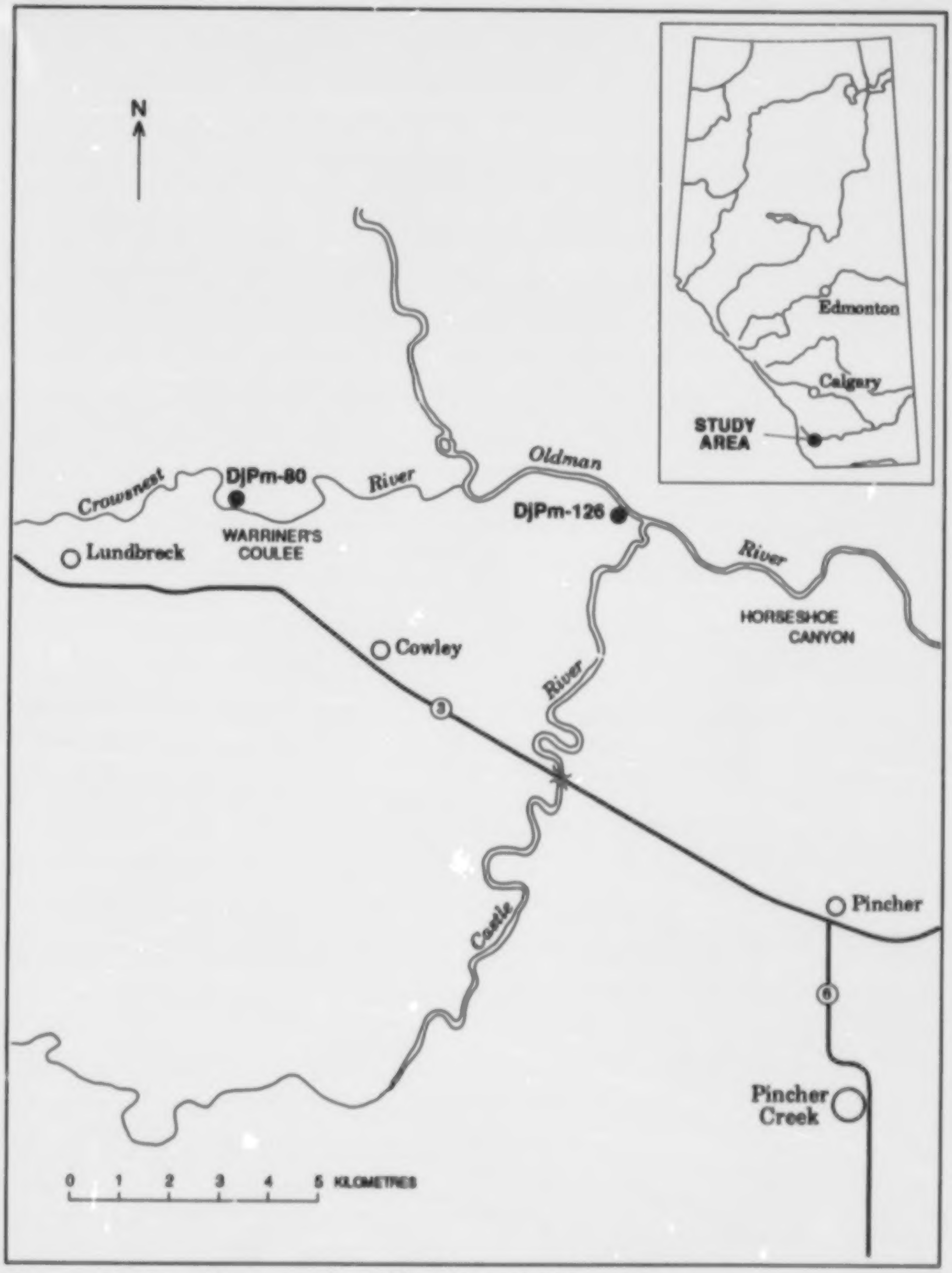

N
Edmonton
Calgary
STUDY AREA
Oldman
River
Crowsnest
River
DjPm-80
WARRINER'S COULEE
DjPm-126
Lundbreck
River
HORSESHOE CANYON
Cowley
3
River
Castle
Pincher
6
Pincher Creek
0 1 2 3 4 5 KILOMETRES

Figure 20. Location map for DjPm-80 and DjPm-126.

attributed to taphonomic processes, such as an overwhelming abundance of cranial, caudal or lower limb elements, may be attributable to the butchering of canids for meat or skins. On the other hand, a generally even skeletal element representation (given taphonomic processes) may indicate accidental death. The skeletal representation of the canids from DjPm-80 and 126 are examined here for insights into their inclusion in the kill assemblage.

All non-bison elements from DjPm-80 and 126 were compared to the canid specimens for wolf, dog, coyote and fox in the University of Calgary archaeology comparative collection. Identified elements were sided, and the minimum number of individuals was calculated, taking into account gross size disparities in the case of cranial and mandible elements. Immature/unfused elements were noted, and elements were examined for cut marks or signs of butchering. The skeletal elements representation for DjPm-80 and 126 is presented in Table 1.

In addition, a number of reports on other plains kill sites were examined for information on canid remains in their kill assemblages. This search was by no means exhaustive, as such would be well beyond the scope of this research. Selection was based on report availability and the ease of extracting information. Results are presented in Table 2.

Canid element representation at DjPm-80 was by no means complete; MNIs for the various elements ranged from 7 for the scapula to 0 for the tibia and patella. All of the major body segments are relatively well represented, however, with MNIs of over 50%. The greatest MNIs were reached for the cranium, mandible and all long bones except the tibia and (understandably) the fibula. With the exception of the tibia, all bone element MNI counts or absences can be explained by taphonomic processes, recovery procedures (screen size) or sample size. When considering taphonomic processes, it should be kept in mind that canid long bones are not as dense as bison long bones; thus, the flatter elements with less marrow cavity, such as the scapula and ulna, may have a better survival rate than other canid long bones.

Although the absence of tibias is difficult to explain, it is unlikely that the canids at DjPm-80 were butchered selectively for their tibias. Given their size, if the canids were killed for their meat, the majority of the

Table 1. Canid element representation at Oldman River Dam project kill sites.

	#Present	#Juvenile	MNI	#Present	#Juvenile	MNI
Cranium	6	3?	6	1R/1L	-	2
Mandible	3R/4L	-	4	1R/1L	-	1
Atlas	2	-	2	-	-	-
Axis	3	-	3	-	-	-
Sacrum	2	-	2	-	-	-
Other vertebrae	count omitted	-	?	1	-	1
Ribs	45	-	2	3	-	1
Scapula	7R/3L	-	7	1L	-	1
Humerus	2R/4L	-	4	-	-	-
Radius	4R/4L	3R/3L	4	-	-	-
Ulna	6R/3L	1R	6	1L	1L	1
Carpal	11R/4L		2	-	-	-
Metacarpals	7R/11L		3	-	-	-
Pelvis	2R/2L		2	-	-	-
Femur	4R/3L	1L	4	1SU	-	1
Patella	-		-	-	-	-
Tibia	-		-	1R	-	1
Fibula	1R/2L	1L	2	1R	-	1
Tarsals	2L		1	3R	-	1
Metatarsals	4R/6L		2	2R	-	1
Sesamoids	7		1	-	-	-
Phalanges	51		2	7	-	1

R=right, L=left, SU=side unknown

NOTE: Certain element categories (carpals, tarsals, vertebrae) have been combined for brevity, although identification and MNIs were calculated on the basis of the specific individual elements. Loose teeth are not included except where they contribute to the MNI count.

Table 2. Canid skeletal element representation at selected plains kill sites.

SITE	LOCATION	AUTHOR	NISP	MNI	ELEMENTS PRESENT
Esutary Bison Pound Level 1	Sask.	Adams 1977	?	1	Complete set of right podial and metapodial elements of a large canid
Level II	Sask.	Adams 1977	?	3	Complete left limb and a second left scapula from a canid (*Canis lupus*) and a left metatarsal from a fox
Glenrock Buffalo Jump	Wyoming	Frison 1970	?	?	Mandible fragment with P_3, P_4 and M_1, nearly complete skull, one front foot, an ulna, two humerii, a femur and a pelivs (all with cut marks)
Maple Leaf site Component II	Alberta	Landals 1986	2	2	2 complete unbutchered mandibles
Component III	Alberta	Landals 1986	?	4	mandibles, teeth, skull fragments, vertebrae, a calcaneum, a pelvis, long bone fragments, a femur and a tibia
Tschetter	Sask.	Walker 1979	34	5	12 mandible fragments, 3 cranial fragments, 4 tooth fragments, 4 vertebrae/fragments, 1 rib fragment, left radius, carpal, 2 left ischial fragments, 3 femur fragments, left tibia fragment, right tarsal, left metatarsal,3 metapodial fragments and 3 phalanges
Vore	Wyoming	Reher Frison 1980		12	26 cranial and mandibular elements, 72 arial and appendicular skeletal elements

carcass probably would have been removed to the place of consumption. Elements such as crania or distal limb elements likely would have been left at the kill site. Since the kill bone bed was excavated quite exhaustively, the absence of canid tibias can be explained best as a result of their breakage into unrecognizable pieces or their removal from the kill locale by scavengers. The bison assemblage from the site had a high incidence of canine puncture marks, gnaw marks and chewed epiphyses, so scavengers were definitely present at the site. If the natural disarticulation schedule of canids is anything like that of medium and large ungulates, the tibia is not one of the first elements to disarticulate from the carcass (Hill 1979). On the other hand, the tibia is an appendicular element that is easily grasped and could have been disarticulated forcibly and removed from the kill area by a scavenging individual seeking to avoid competition with other scavengers at the site. The absence of the patella could be explained by the same process; however, since the canid patella closely resembles bison distal sesamoids, its absence could also be attributed to its misidentification as bison remains.

No obvious cut marks or direct evidence of butchering were observed in the DjPm-80 canid assemblage. Some green bone fractures were noted on metapodials, but these need not have been culturally related.

The canid element representation at DjPm-126 is considerably more patchy, with a MNI count of 2 and numerous elements not represented at all in the assemblage. All major body segments were represented relatively equally, however. No general pattern of element distribution can be discerned, save for poor representation of elements more subject to destruction by taphonomic processes and small items likely to fall through the screen. Evidence for butchering was not noted.

The canid skeletal element representation at the other selected plains kill sites is rather inconclusive. Representation varies widely between sites. There is a bias towards cranial and mandible remains, but this may be due to a greater propensity to report such remains and to identify them as canid (as opposed to a miscellaneous mammal category). An obvious patterning across a diverse variety of kill sites may be too much to expect, especially since the presence of canids at the various sites could be due to a number of reasons. Butchering and skinning evidence was reported for the canid assemblages at the Vore site (Walker 1980:163) and the Glenrock Buffalo Jump (Frison 1970:25) but not for the other sites listed in Table 2.

SPECIES IDENTIFICATION

There are a number of canid species local to southern Alberta that should be considered when identifying canid remains at the Oldman River kill sites. These include gray wolf (*Canis lupus)*, coyote (*Canis latrans)* and the foxes (*Vulpes* sp. and *Urocyon* sp.). In addition, the canids may be native domestic dogs (*Canis familiaris*). The foxes can be distinguished osteologically from other canids by size alone. For the purpose of this analysis, distinction between the fox genera *Vulpes* and *Urocyon* was not attempted.

Although the wolf, coyote and domestic dog are all of the same genus (*Canis*), often it is possible to distinguish osteologically between species, provided mandibular and/or cranial elements are present. Wolves and coyotes are relatively easy to differentiate. According to Lawrence and Bossert (1967), wolves have a relatively small brain case and a massive rostrum; these are a function of the large size of their prey, which necessitates powerful jaws. On the other hand, coyotes prey on smaller species and therefore have a more slender rostrum and a generally long, slender skull with small, narrow teeth. Dogs are more difficult to distinguish osteologically because they are extremely variable and often superficially resemble either wolves or coyotes. Large dogs can be distinguished from wolves by relatively small teeth, an elongated interorbital region of the skull and an elongated palate. Smaller dogs can be distinguished from coyotes by a relatively larger canine, greater width across the incisors and a small upper second molar (M^2). In addition, coyotes have relatively long lower incisors and a fourth premolar (P_4) that usually has a secondary accessory cusp behind the main cusp.

Since wolves, coyotes and dogs are so similar in osteological form, it is best to use a number of different features to identify specimens. These features are defined by series of measurements and ratios for crania and mandibles. Although discriminant functions are useful in distinguishing canid species (Elder and Hayden 1977; Lawrence and Bassert 1967), the Oldman River sample did not lend itself to this type of analysis. The sample was small and fragmented. Most significantly, the total skull length, which is used to reduce all other measurements to proportion (Elder and Hayden 1977: 18), was measurable for only one of the Oldman River specimens. Because of these problems, I have concentrated on individual comparisons of the various measurements I was able to take from the specimens with corresponding measurement ranges for the three *Canis* species. Since I did not have a large comparative sample, I have relied upon measurement ranges for *Canis* species provided in a number of published and unpublished reports.

A total of four relatively complete and two partial cranial specimens, as well as three relatively complete right mandibles and four relatively complete left mandibles, from the DjPm-80 faunal assemblage were identified as canid. A number of loose canid teeth were also recovered from that site, but these could all be attributed to missing teeth from the specimens described above. At DjPm-80, crania provided a MNI of 6; the mandibles provided a MNI of 4.

The DjPm-126 faunal assemblage contained a single right upper carnassial, an upper canine, a relatively complete right mandible, a left mandible fragment, a right and left first lower carnassial, and two unidentified premolars. All elements could be accounted for by a MNI of 1.

Measurements were chosen to correspond with comparative measurement range data for the three canid species provided in the literature. Wherever possible, measurement orientation followed von den Dreisch (1976). The great majority of the measurements were taken with vernier scale callipers, to 0.1 mm. Three measurements – greatest, condylobasal and basal lengths of skull – were too long for general callipers and were taken with curved (spreading) callipers; these are accurate to only 1.0 mm.

Cranial measurement range data for wolves, coyotes and a number of dog species are provided in Walker and Frison (1982:136-136). Duplicate measurements from DjPm-80 and 126 canid specimens are presented in Table 3. Two of Walker and Frison's measurements are omitted. Measurement of breadth of zygomatic arch was not possible because the zygomatic arch was missing on all of the specimens. The meatus to alveolus I length was possible for one specimen, but the measurement has been omitted because it deviated greatly from any of Walker and Frison's

Table 3. Cranial measurements for DjPm-80 and DjPm-126 canids.

	DjPm-80						DjPm-126	
MEASUREMENT	#1490	#2567	#2797	#5627	#5938	Mean	#1099	#14311
Gr L skull	-		-	215	-	-		
Condylonasal L skull	-		-	206*	-	-		
Basal L skull	-		-	192*	-	-		
Gr L nasals	88.4		-	71.9	72.0*	77.4		
L snout	94.2		85.8*	97.1^{W}	-	92.4		
L palate	115.4		108.9	112.9	-	112.4		
L upper carnassial	22.1	1.02**	22.7^{W}	23.0^{W}	22.9^{W}	22.7^{W}	18.7	24.3
Gr Br mastoids	-		-	74.2	-	-		
Gr Br occipital condyles	44.9		45.0	42.6	44.3	44.2		
Gr Br skull	-		-	69.5	-	-		
Lst Br postorbital cons.	38.0		-	37.1	-	37.6		
Br frontals	60.7		-	47.6*	-	54.2		
Lst interorbital Br	45.8		39.1	39.9	-	41.6		
Gr Br palate	74.6		-	73.7		74.2		
Occiput-nasion L	-		-	110.5*		-		
Cranial height	-		-	59.4*		-		
I^1 - m^2 Length	110.6		105.2	110.6	106.9	108.3		

Gr=greatest, Lst=least, L=length, Br=breadth, *measurement below wolf range, **measurement below coyote range, W=measurement above dog range

NOTE: The measurement for DjPm-80 Specimen #2567 (probably fox) was not included in the mean calculated for the length of upper carnassial measurement.

ranges (one-third their values). This may be due to problems in replicating the measurement, since it is one of the few cranial measurements not demonstrated in von den Dreisch (1976).

Selected mandibular measurement range data for wolves and coyotes are provided in the form of ratios by Lawrence (1968:46); bivariate plots of other selected mandibular measurements for wolves, dogs and prehistoric canid specimens are provided by Walker and Frison (1982:162) after a method outlined by Bokonyi (1975); and bivariate plots of Lawrence's ratios for modern coyotes, wolves and dogs and prehistoric canid specimens are provided by Driver (1976). The DjPm-80 and 126 canids were measured using Driver's measurements, and one additional measurement (alveolar length of molar row) used by Walker and Frison (1982) was taken. These are presented in Table 4. Lawrence's first three ratios were calculated as well. The resulting values for ratios II and III differed radically from Lawrence's figures. Since both ratios involved the basal width of the ascending ramus (which was difficult to replicate), the corresponding ratios are omitted. Figure 21 compares some of the DjPm-80 and 126 measurements with Walker and Frison's bivariate plots of alveolar lengths of the premolar row and the alveolar length of the molar row for Eskimo dogs, wolves, and some Wyoming prehistoric canids (Walker and Frison 1982:162) and with plots for two canids from the Maple Leaf site in the Crowsnest Pass (Landals 1986). Figure 22 compares some of the DjPm-80 and 126 measurements with Driver's bivariate plots of M_1 length versus mandible width ventral to M_1 for dogs, coyotes, wolves and a number of Alberta prehistoric canids (Driver 1976:30).

Specimen #2567 from site DjPm-80 is considerably smaller than all the adult *canis* species specimens to which it was compared; the bone structure was less porous, and the carnassial was more developed than an immature *Canis familiaris* of similar size. Specimen #2567 was similar in size to *Vulpes velox* specimens and showed no significant differences from comparative specimens for *Vulpes* and *Urocyon*; therefore, it is tentatively identified as fox.

The left upper carnassial from DjPm-126 fell within Walker and Frison's length range for coyote and a number of prehistoric dog populations. It was too small for the wolf, Greenland Eskimo Dog and the prehistoric Wyoming canid ranges. The mandible from DjPm-126 (probably

Table 4. Mandibular measurements for DjPm-80 and DjPm-126 canids.

	DjPm-80								DjPm-126
MEASUREMENT	#1485	#1486	#5628	#5936	#5937	#6114	#6115	Mean	#15712
Mandible W ventral M_1	14.3	13.5	13.5	14.2	14.6	13.5	13.3	13.8	10.3
Crown L of M_1	26.9	27.8	26.9	27.8	27.4	27.7	27.6	27.4	22.8
W base a. ramus*	10.5	10.4	10.8	10.9	10.6	10.2	10.4	10.5	6.9
H a. ramus	-	-	58.6	57.5	57.8	-	-	58.0	-
Lst. W post. to canine	11.9	12.0	10.5	11.8	12.4	10.9	10.6	11.4	7.6
Alveolar L I_1 - post P_2	-	-	43.8	44.9	-	-	40.4	43.0	-
Alveolar L P_1 - post M_3	88.5	88.9	85.7	89.3	89.5	88.0	87.9	88.3	75.2
Alveolar L P_1 - post P_4	47.3	47.1	44.4	46.2	46.1	46.1	46.3	46.2	40.3
Alveolar L M_1 - post M_3	46.7	43.7	42.0	43.4	43.4	43.5	43.0	43.2	36.8
Ratio I	0.53	0.49	0.50	0.51	0.53	0.49	0.48	-	0.45

L=length, W=width, H=height, Ratio I=mandible with ventral M_1; crown length of M_1
*Measurement probably taken improperly.

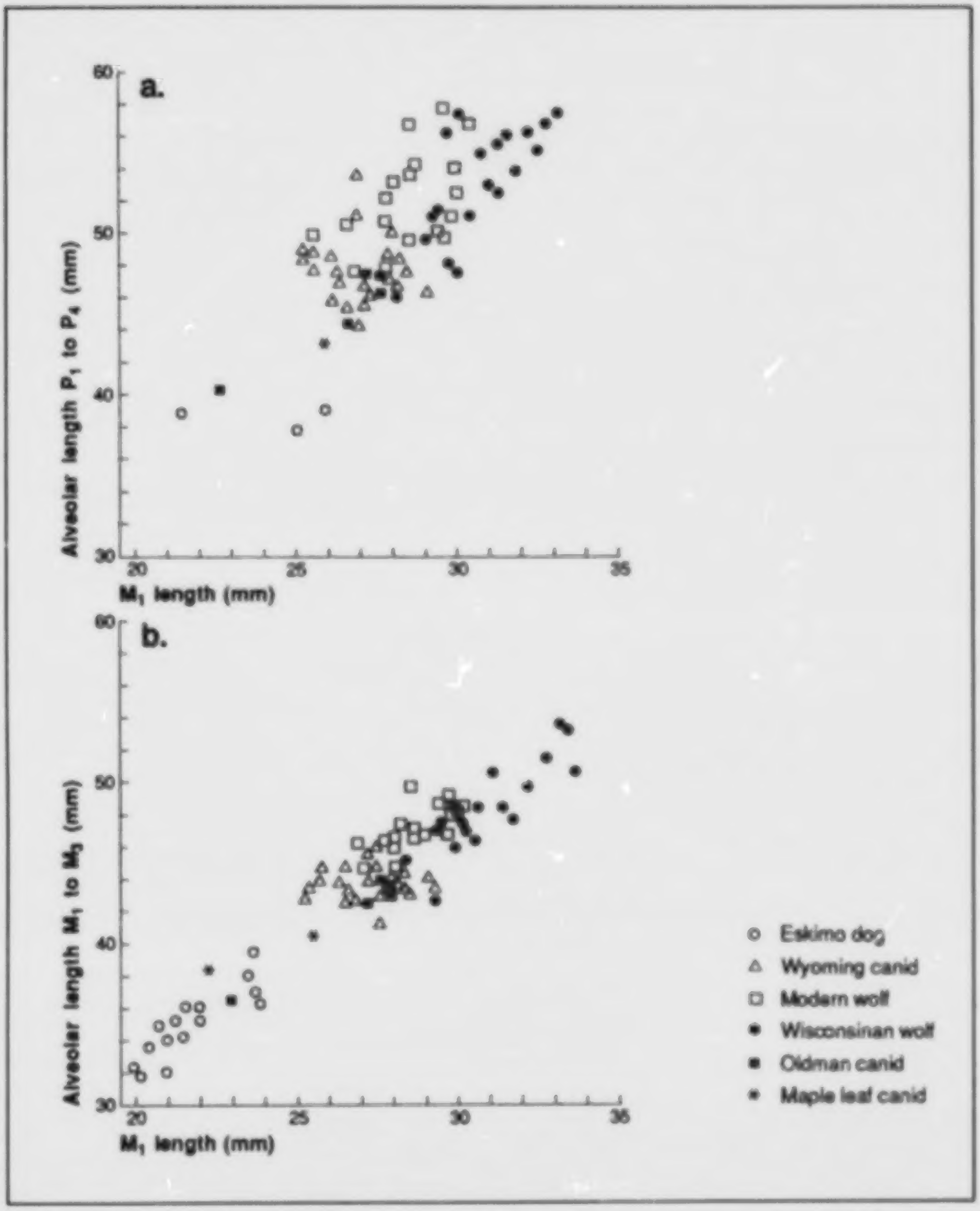


Figure 21. Bivariate plots of a. premolar and b. molar rows vs. M_1 length (after Landals 1986; Walker and Frison 1982)

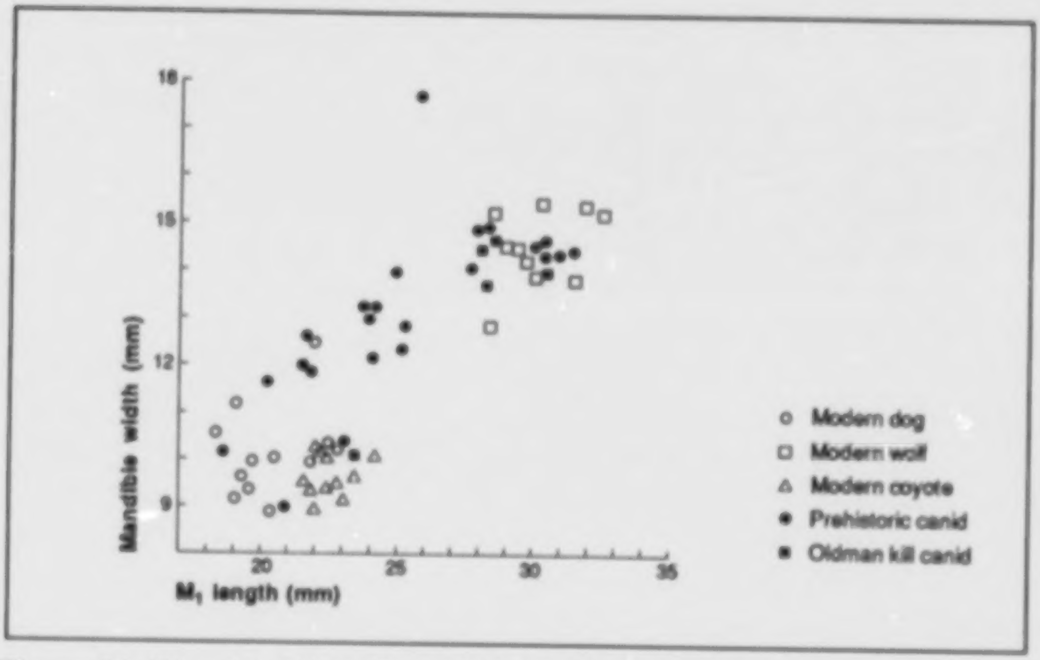


Figure 22. Bivariate plots of mandible width vs. M_1 length (after Driver 1976).

from the same animal) is quite small and resembles the coyote mandibles in the comparative collection. The Ratio I measurements fit within Lawrence's range for both wolves and coyotes. When mandible width versus M_1 length for this specimen is plotted, it falls within the coyote grouping as presented by Driver (1976). This specimen is probably a coyote, although the possibility of a coyote-dog cross cannot be eliminated. The right upper carnassial from DjPm-126 falls within the size range for wolves but also within the size range for the Wyoming canids.

The remaining canid specimens from DjPm-80 pose an interesting problem. The cranial measurements do not fit consistently within the ranges for any of the canid species described in Walker and Frison. They resemble the Greenland Eskimo Dog measurements slightly more than they do wolves, but they fall outside the range for the Greenland Eskimo Dog and within the wolf measurement ranges in a few measurements. The length of the upper carnassial is especially notable in this case, since four specimens fall outside the range of the Eskimo dogs, the fifth (#1490) is at the upper limit, and all fall within the wolf range. However, three of the same specimens have a number of other measurements which are below the wolf range but within the Greenland Eskimo Dog range. In general, the DjPm-80 canid measurements fit within the prehistoric Wyoming canid range most closely, although specimen #2797 falls below the Wyoming canid range in length of snout, specimen #5627 in breadth of frontals, and specimens #5627 and #5938 in I^1 to M^2 length.

The mandibles from DjPm-80 show a similar pattern. Bivariate plots for alveolar length of the premolar row and the molar row versus the length of the lower carnassial place the DjPm-80 canids well outside of the Eskimo dog range, bordering on the lower end of the wolf range. This is squarely within the plotted range for the Wyoming canids. Bivariate plots for mandible widths below the lower carnassial versus the length of the lower carnassial once again place the DjPm-80 canids well above the Eskimo dog range, on the lower end of the wolf range, and within the range of a number of Alberta prehistoric canid specimens. Driver names these "Extra large" dogs the "Belly River" type (1976:20). Walker and Frison propose that the similar Wyoming prehistoric population "represents hybrids between wolves and aboriginal North American large dogs (as defined by Allen) during the Late Prehistoric period" (1982:165). It is possible that both the Alberta and Wyoming prehistoric canid populations were from a hybrid wolf/dog lineage, but this type of canid appears to have been quite common across the northwestern plains during the Late Prehistoric Period. Although there is a possibility of feral or wild hybrid populations, it is probably safe to say that the majority of these animals were large, domesticated dogs or domesticated dog/wolf hybrids. The extremely worn teeth on one of the canids from DjPm-80 also suggest domestication. As a result, the DjPm-80 canids are identified tentatively as *Canis familiaris*. The right upper carnassial from DjPm-126 could be from either a large dog or a wolf.

CONCLUSIONS

Considering that canid remains represent the most abundant non-bison species in kill site assemblages, and that they are present in such assemblages more often than not, their presence represents an interesting problem. A number of hypotheses have been generated to explain this phenomenon. The canid assemblages from two Late Prehistoric bison kill sites in southwestern Alberta have been examined in light of these hypotheses, and the results have been compared to a selected number of other plains bison kill site canid assemblages.

The Oldman kill site assemblages contain a minimum number of 10 canids. One of these is probably fox, and another has been identified as coyote. The remainder are all large canids which border on the wolf range of cranial and mandibular element proportions. They fall well within the range of canids which Driver calls "Extra large" dogs or the "Belly River Type," as well as the range of Wyoming canids which Walker and Frison call wolf/dog hybrids. Apparently, both types are assumed to be domestic. The skeletal element distribution leans towards an interpretation that these canids were not butchered, although this should be considered extremely tentative in the case of DjPm-126, given the small sample size.

Assuming the absence of butchering, it is unclear why the large sample of domestic dog at DjPm-80 should be recovered from a kill site assemblage. Possible explanations could be found in the "bad-dog" and "stupid-dog" hypotheses; these individuals could represent a particularly unruly population of camp dogs which got a little too involved in the kill event for their own good. Such explanations are plausible where only a few canid individuals are present in an assemblage, but six dogs seem to be a rather large number to be crushed accidentally by a group of 16 thrashing bison or bopped over the head in a fit of rage by the annoyed butchers of 16 dead bison. Considering the number of canids present, the high degree of carnivore damage to the bison assemblage, and the limited butchering of the bison, it is worth considering that these canids could be feral hybrids lured to the site by the carrion and hunted for their pelts or domestic dogs accidentally poisoned by wolfers.

It is difficult to say anything conclusive about the DjPm-126 canids, given the small sample. However, the sample size itself, coupled with the fact that all of the mandibular/cranial remains fell within the range of coyote or wolf, may indicate natural death, possibly associated with competition over kill remains. Alternately, the kill at DjPm-126 could have been used as bait by wolvers or native hunters, and the canids there could have been killed for their pelts.

The "unbutchered" nature of the DjPm-80 canid assemblage and the reported evidence of canid butchering at several other plains kill sites suggest, at first glance, that there probably is no single reason for canid presence at kill sites. However, the frequency of canid remains in kill site assemblages points towards some sort of general cultural patterning. If hunting of wolves for their pelts was commonplace at kill sites, at least during the Late Prehistoric Period, it would provide a plausible explanation of why the canid remains in both assemblages show little butchering evidence or "skinning" cut marks, since skill of the individual doing the skinning could account for the presence or absence of cut marks. Therefore, it is important to investigate the prehistoric wolf/dog hybrid situation further, to collect more accurate data on canid skeletal element representation in kill sites, and to examine canid assemblages specifically for "skinning" cut marks.

THE FIRST ALBERTANS PROJECT:
1988 and 1989 RESEARCH

By
Martin P. R. Magne and John W. Ives
Archaeological Survey of Alberta

INTRODUCTION

In late 1986, the Archaeological Survey of Alberta began planning a project to investigate the very earliest period of settlement in the province. This effort, which came to be named the "First Albertans Project," was prompted by a desire to initiate meaningful, long-term study which would be of considerable significance to the prehistory of Alberta and which could foster collaborative research within and beyond our organization. We felt this type of collaboration was a useful response to the trend of diminishing resources affecting agencies like the Archaeological Survey of Alberta (ASA).

Discussion of several potential research issues with staff members made it clear that there was strong interest in the topic of how native populations first appeared in the region now called Alberta. This topic was not necessarily restricted to a provincial scope, since many archaeologists have assumed that an "ice-free" corridor, running from the eastern slopes of Alberta, through northeastern British Columbia, and into the Yukon and Alaska, was by far the most likely route through which ancestral native populations penetrated Late Pleistocene Cordilleran and Laurentide ice masses and reached the remainder of the Americas. The Pleistocene settlement of the Americas is one of the extraordinary stories in world prehistory, setting in motion as it did more than 11,000 years of native cultural development, from the high civilizations of Central and South America to the subtly refined and successful hunter-gatherer lifestyles found throughout the Americas. If parts of Alberta had a role in the earliest part of this story, then there seemed every reason to explore this portion of the province's prehistory.

Paradoxically, few studies have devoted systematic attention to the corridor region. Despite widespread assumptions about the prospective role of the corridor in the first settling of the New World, notable gaps exist in our palaeoenvironmental and archaeological knowledge of the region. No doubt, this stems in part from the fact that rugged and remote terrain characterizes much of the corridor region. It is probably also a reflection of the inherent risks in undertaking such a research project – the chances of deliberately discovering a particularly early site with a bearing on this issue are not overwhelming.

In consideration of these factors, we wished to undertake a study with principles that assured success in several respects, and particularly, one which would be more than a search for early sites along the eastern slopes region. Consequently, the First Albertans Project was designed as a long-term effort not intended to be highly intensive in any one year, capable of focusing on a variety of areas over a number of years, and subject to review and new orientations after intervals of several years. The chief costs associated with the project were to be those of supporting small field parties for relatively brief periods of time, supplemented by backhoe testing, and so forth.

Investigation of an "ice-free" or western corridor became an important component of the First Albertans Project. The primary objective of this part of the project is to determine if there is detectable evidence of human presence within the corridor more than 11,500 years ago, since assumptions concerning the exact route of initial human entry south of the Late Wisconsinan ice masses have been much more common than field research. Although ASA staff associated with the project find persuasive a scenario in which the first peopling of North America south of the ice masses took place in the millenium or two prior to 12,000 years BP, through rapid penetration of the corridor region by relatively small populations, this position is certainly recognized to be in need of empirical verification.

In fact, no existing evidence allows a fully informed choice between the two routes that could have been used in the interval between roughly 12,000 and 25,000 years ago – that is, a route extending from eastern Beringia along coastal Alaska and British Columbia or a route southward along the western or ice-free corridor region. Further progress in this respect can only come from actual field work. Since the corridor region is a terrestrial environment accessible for investigation, additional studies are certainly warranted. In short, the requisite evidence will have little chance of being found if we fail to look or if we fail to follow up leads and fortuitous exposures in the corridor region. A more lengthy discussion of these aspects of the project is available in Ives et al. (1989).

The First Albertans Project is a multifaceted venture, extending beyond the issues just discussed. From the beginning, it was apparent that there was a need to improve upon the amount and integration of palaeoenvironmental information available for the late Pleistocene and early Holocene of western Alberta. Nearly every facet of the First Albertans Project has had palaeoenvironmental studies built into it from the outset, including assessment of Pleistocene geomorphology, pollen analysis of lake and other sediments, macrobotanical studies, and identification of ancient land surfaces through occurrences of various tephras. Bibliographic research in these areas also was regarded as essential in integrating the disparate bodies of data that already existed but were not uniformly known to researchers in different disciplines.

Finally, the project is in no way restricted to the idea of discovering evidence of early passage southward through the corridor region. If the corridor region did not serve as the early route of penetration, or if evidence of such early passage cannot be detected, the early, discoverable traces of human occupation in Alberta are still of considerable interest in their own right. Somewhat later Palaeo-Indian sites may represent subsequent movements either northward or southward in the greater corridor region, or the diffusion of ideas through pre-existing populations. Elsewhere in Alberta, they represent colonization of a vast, recently deglaciated region, with archaeological records giving way to the increasingly sustained human occupation of the later Early Prehistoric Period. The Fletcher site in southern Alberta has been of particular interest. Along with this component of the project, research designs, search strategies and initial results for the Bow River, North Saskatchewan River and Grande Prairie regions are discussed here (Figure 23).

BIBLIOGRAPHIC RESEARCH

Our needs in this area have been met most ably by Alwynne Beaudoin's Annotated Bibliography: Late Quaternary Studies in Alberta's Western Corridor, published as Archaeological Survey of Alberta

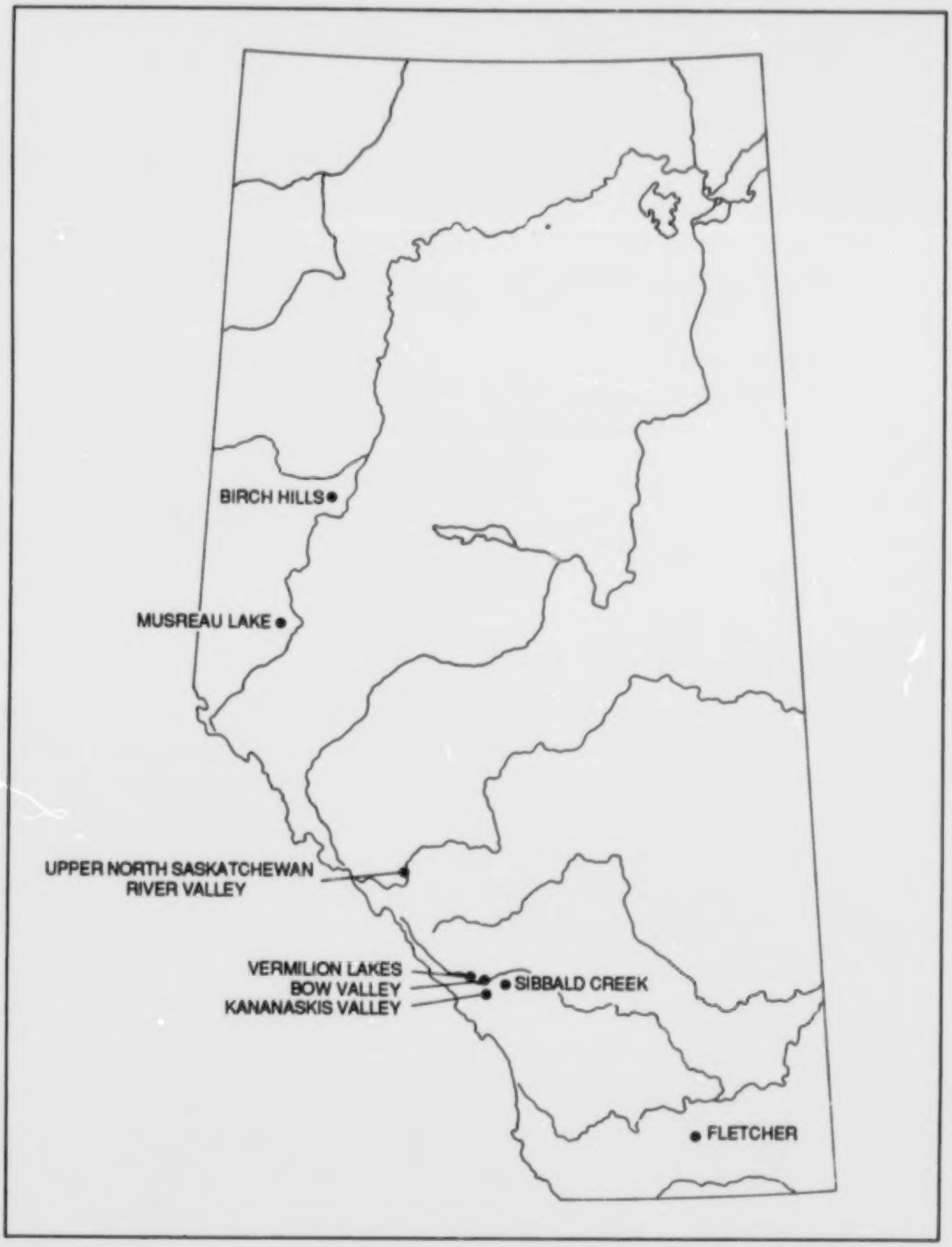

BIRCH HILLS
MUSREAU LAKE
UPPER NORTH SASKATCHEWAN RIVER VALLEY
VERMILION LAKES
BOW VALLEY
KANANASKIS VALLEY
SIBBALD CREEK
FLETCHER

Figure 23. Locations of sites discussed and First Albertans Project field work during 1988.

Manuscript Series No. 15 in 1989. This work, which is intended for periodic updating, organizes the temporal, topical and areal coverage of the palaeoenvironmental literature associated with the corridor region. It has allowed systematic use of reference material in the fields of Late Quaternary geology, palaeontology and other branches of palaeoenvironmental research.

UPPER NORTH SASKATCHEWAN VALLEY RESEARCH

The first episode of field research for the project took place with a two week survey in 1987 in the North Saskatchewan River valley, mainly as a pilot study to test and refine research design (Ronaghan and Beaudoin 1988b). This survey led to the Bow River valley study the following year. In both surveys, geomorphological characteristics of known early Holocene sites were used to guide the selection of survey locales.

No archaeological sites were discovered in the upper North Saskatchewan valley within the target time range; however, several sections of Holocene deposits were examined. These yielded useful information about the character of geological processes in the region. The survey as a whole was most instructive in the early stages of the First Albertans Project, indicating particularly the depths at which some of the early Holocene sites for which we are searching must be buried. A radiocarbon sample obtained at 4.25 m below surface, below tephra, gave a date of 6,720 ± 150 years BP (AECV 463; Ronaghan and Beaudoin 1988b:43). This survey was limited in scope, and team members believe that the area yet holds considerable promise for turning up deposits of interest.

BOW RIVER VALLEY RESEARCH

Our rationale for conducting field work in the upper Bow River valley is based primarily on the presence of Early Prehistoric sites near the study area. The Vermilion Lakes site (EhPv-8) was found to the west, in Banff National Park (Fedje 1986), and the Sibbald Creek site (EgPr-2) is located east of the study area, south of the Bow valley (Gryba 1983). In addition, three Clovis points, one unfluted "Clovis" point and one possible Midland point have been collected from the surface of EhPv-1 near Lake

Minnewanka in Banff National Park (Gryba 1988:[A2-3]-[A2-7]). Since Early Prehistoric sites can be found at either end of the study area, it was hypothesized that this attractive river valley served as a focus of early settlement and that additional Early Prehistoric sites can be found here. In several ways, the Bow valley research is similar to that undertaken in the Nenana valley of Alaska (e.g., Powers and Hoffecker 1989).

Survey in the Bow valley depends in part on being able to predict site locations using the three Vermilion Lakes sites' characteristics as a guide (Vermilion Lakes site itself, Second Lake site and Christensen site; the latter two are younger). The following geomorphological and sedimentological attributes were isolated for the Vermilion Lakes sites:

(1) The sites are all on alluvial fans;
(2) The sites are on well-drained, gently sloping terrain;
(3) The sites are on south facing sides of a chain of lakes that may be the remains of a once larger lake;
(4) The early deposits at these sites are ca. 2-2.5 m below surface within silt/sand aeolian matrices, overlain by alluvial/colluvial gravels;
(5) The sites are multicomponent and contain pre- and post-Mazama occupations;
(6) Later prehistoric site deposits are present near or on the surface.

In 1988, prefield air photo interpretation, combined with available site inventory data and the locational variables identified for the Vermilion Lakes site complex, were used to rank the alluvial fans identified by Rutter (1972) on his surficial geology map of the Banff to Morley Flats area. Initial field studies involved examination of available exposures on alluvial fans, limited shovel testing, and re-evaluation of several previously recorded sites. A deep testing (backhoe) program had been planned for 1988; however, the success of the above procedures allowed deep testing to be deferred to 1989.

Four new sites (EgPt-17, EgPs-46, 47 and 48) were recorded, and two previously recorded sites (EgPt-3 and EgPu-3) were re-evaluated (Figure 24). EgPs-46, 47 and 48 are stratified, multicomponent, buried campsites located on an alluvial fan formed by Heart Creek, on the south side of the Bow River, east of Lac des Arcs. Cultural deposits occur from near surface to below 3 m in depth and are visible in bank exposures.

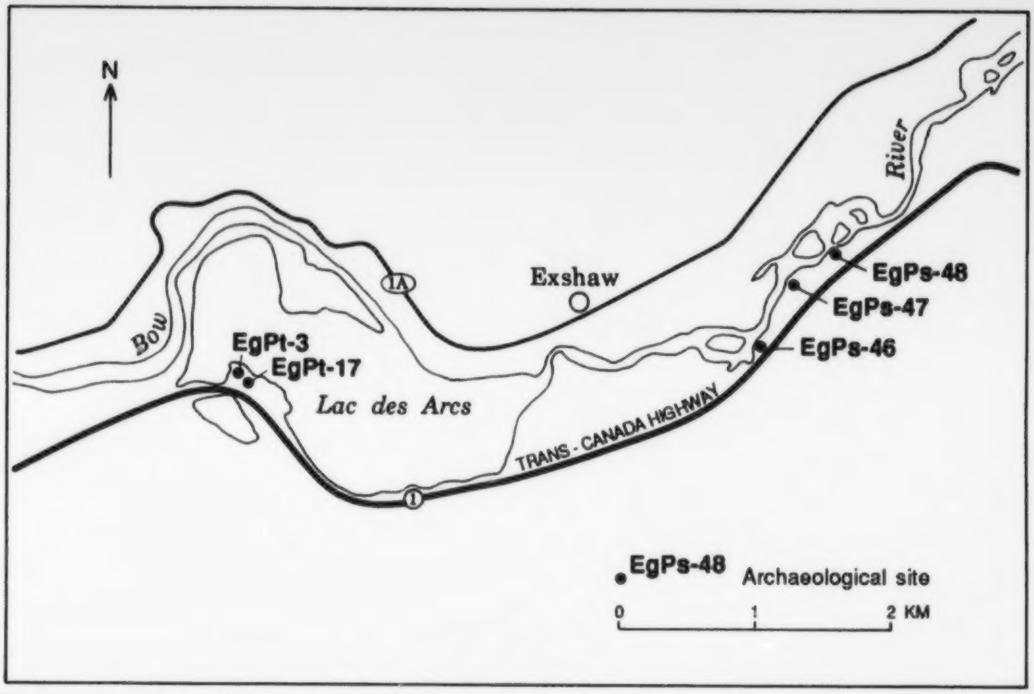


Figure 24. Locations of archaeological sites studied during the 1988 Bow River valley field season.

At EgPs-46, a pit feature was observed at a depth of 2.6-2.8 m below ground surface. This pit contained broken bone and fire-broken rock; however, a bone sample submitted for dating contained insufficient collagen. Bone and FBR were observed above a tephra layer at EgPs-47, but no dates were obtained.

The most complex site observed on the alluvial fan east of Lac des Arcs is EgPs-48. The eastern portion of this site exhibits stratigraphy consisting of alternating layers of aeolian silt and alluvial cobbles, plus a distinct band of white carbonate. The western area contains the same aeolian deposits, with over 3 m of fine silts deposited against the toe of the fan. This area contains the white carbonate layer but also includes a definite tephra layer, possibly Mazama, at 76 cm below surface. Below the tephra lie 60 cm of distinct palaeosols.

A well-defined cultural horizon at EgPs-48 contained broken and calcined bone, a black siltstone scraper and eight quartzite flakes, immediately below the carbonate layer. Four 1 x 1 m units placed in the western area of EgPs-48 allowed definition of two cultural occupations below the tephra layer. The upper occupation layer contains only bison bone and no lithic artifacts. The lower layer contains bison and bighorn sheep bones, in association with a large, grey siltstone flake, a small quartz crystal, a very small (i.e., microdebitage) quartz crystal flake and three seeds (currently unidentified as to species).

Radiocarbon analyses on charcoal deposits below the tephra produced eight dates, ranging from 8,250 ± 130 years BP (AECV 671C) to 7,040 ± 360 years BP (AECV 658C). Three dates from charcoal above the tephra range from 5,720 ± 150 years BP (AECV 673C) to 3,170 ± 100 years BP (AECV 675C).

EgPt-3, on Lac des Arcs, yielded a disarticulated left hind limb of *Bison* sp. at 4.25 m below surface, and a bone sample returned at date of 7,810 ± 120 years BP (AECV 624C). No lithic artifacts are associated with this particular profile as yet.

This initial survey of the Bow valley has not produced deposits of ages comparable to those at Vermilion Lakes; however, deeper deposits remain to be investigated. The radiocarbon dates obtained so far are promising in themselves, in that Early Middle Prehistoric Period occupations are well represented. Furthermore, the site discovery techniques have been successful in isolating fairly restricted areas that are deserving of further research.

Research in the Bow valley in 1989 consisted of deep testing of selected locales, as well as closer inspection of areas where sites were found in 1988. Areas for testing were selected on the basis of growing experience with relative ages of alluvial fan depositional sequences in the valley. Preliminary survey is being planned for the Kananaskis valley area, which represents a "natural" north/south travel corridor within the mountains front, joining the Bow valley to the Crowsnest Pass area. There is also a low pass which joins the Kananaskis valley to Sibbald Creek, where Gryba (1983) excavated a Palaeo-Indian site, currently of unknown age, which contained basally thinned points. Complete surficial geological mapping is not available for the Kananaskis valley, but, unlike the Bow valley, far less industrial activity has occurred here. There are both benefits and drawbacks to this, in that sites are less likely to be disturbed but may be much more difficult to find in the absence of artificial exposures. More details concerning the Bow valley research can be obtained from Newton (this volume).

NORTHWESTERN ALBERTA RESEARCH

In 1985, an artifact collection documentation program was initiated in the Grande Prairie region. This area encompasses a rich grassland zone or ecotone region which is now subject to considerable cultivation (Magne 1986). As a consequence, artifact collections are abundant and contain representatives of the entire sequence of plains stone artifact styles, as well as northern and western materials. Palaeo-Indian materials are very well represented and include the full range of fluted, resharpened fluted and stemmed forms. By the end of the 1988 season, well over 100 private collections had been photographed (M. Wright, personal communication 1990).

During the 1987 season, limited survey was undertaken of Glacial Lake Peace shorelines, as well as possible caves and rock shelters. This was followed in 1988 by preliminary survey along prominent uplands in the Birch Hills. These and the Saddle Hills would have been the first landforms exposed following deglaciation and drainage of Glacial Lake Peace. At present, Glacial Lake Peace formation and drainage chronology is not well understood and can be bracketed only by approximate ages of 15,000 and 11,000 years BP.

The eastern end of the Birch Hills exhibits pronounced terraces which hold excellent promise for discovery of beach and lakeshore landforms. Most interestingly, fluted and basally thinned projectile points in collections show strong association with these areas and, in fact, contain one of the greatest densities of these point styles in Alberta (Gryba 1988). Additional survey in 1989 attempted to confirm a perceived co-association of such points with geomorphological features at about the 2,000 foot contour level, possibly a quasi-stable level of Glacial Lake Peace (Figure 25). In many ways, this strategy parallels research successfully undertaken by Storck in southern Ontario (e.g., Storck 1979).

The 1989 research in the Birch Hills focused on higher elevation areas with beach deposits. The survey utilized exposures provided by gravel pits, agricultural clearances and seismic exploration lines. In addition, Glacial

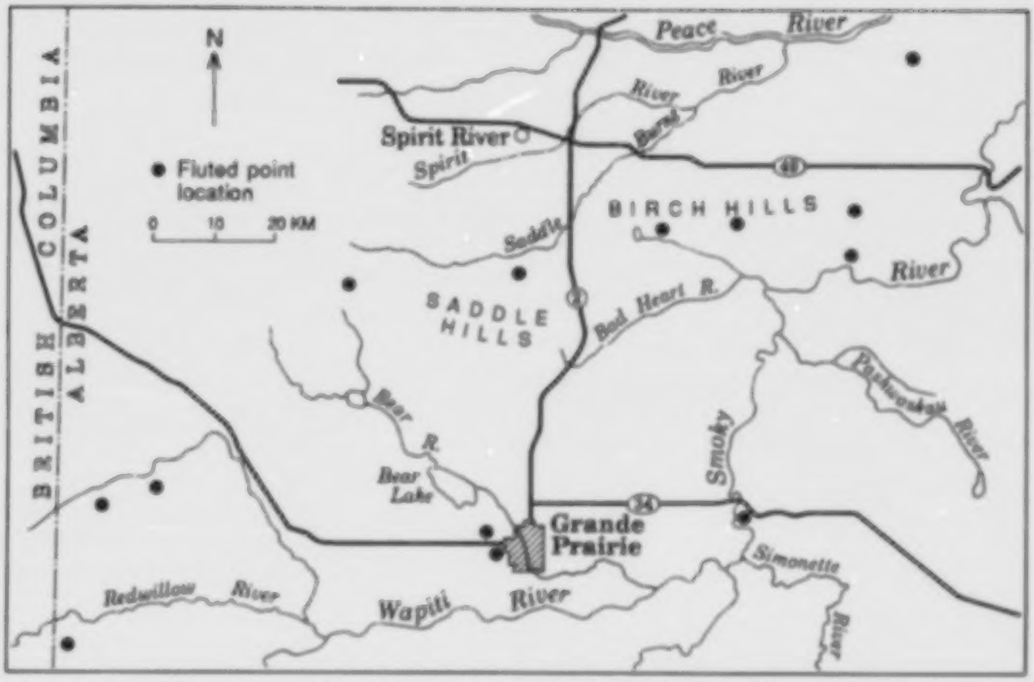

Peace River
River
Burnt River
Spirit River
Spirit
N
Fluted point location
0 10 20 KM
49
BIRCH HILLS
Saddle
River
SADDLE HILLS
Bad Heart R.
Bear R.
Bear Lake
Puskwaskau River
Smoky
34
Grande Prairie
Simonette River
Redwillow River
Wapiti River
BRITISH COLUMBIA
ALBERTA

Figure 25. Fluted point locations around the Saddle Hills area of northwestern Alberta.

Lake Peace shoreline survey was undertaken for the Musreau Lake and Saddle Hills areas, with disappointing results. This survey was conducted partly as a means of assessing general archaeological potential in densely forested regions which are now being identified for private harvesting. The Musreau Lake area is particularly interesting in that it exhibits peninsular features, large embayments and, in general, a maximum amount of shoreline area which can be covered with relatively little survey effort. This survey relied heavily on existing clearance by gas well access roads, aggregate pits and forest harvest areas. In the immediate vicinity of Grande Prairie, testing was undertaken at site GhQu-4 on top of Saskatoon Hill. Discovered in 1988, this site exhibits aeolian stratified deposits which may have started forming concurrent with the formation of Boone Lake 12,600 years ago. As of 1989, cultural deposits greater than 4,000 years of age were located, with tantalizing evidence for yet more ancient remains.

FLETCHER SITE

Research at the Fletcher site is aimed at providing information about the later phases of Palaeo-Indian occupations in Alberta. Excavated in 1963 and 1964 by Richard Forbis and B.O.K. Reeves (Forbis 1968; Wormington and Forbis 1965), the Fletcher site is a bison kill containing Alberta and Scottsbluff projectile points. Michael Quigg tested the site in 1975 to assess the bone bed and to obtain radiocarbon dates from unburned bone; however, these dates varied widely and have been considered unacceptable (Quigg 1976). Michael C. Wilson and A. MacWilliams began geoarchaeological studies in 1985, leading to analyses of sediment structure and chemistry and also finding aquatic or wetland plant seeds in the bone bed deposits (MacWilliams 1986; Wilson and MacWilliams 1987). J. Rod Vickers excavated a 2 x 2 m test pit in 1987 and 1988 to clarify the site's stratigraphy, and, while he recovered no lithic artifacts from his excavations, a dense bone bed was found to overlay water-saturated deposits containing an abundance of seeds, plant stem fragments, gastropods and ostracodes. *Cyperaceae* seeds recovered from just below the bone bed yielded an AMS date of 9,380 ± 110 years BP (To-1097; Vickers and Beaudoin 1989).

The Fletcher site is now the subject of a multidisciplinary study being overseen by J. Rod Vickers and Michael C. Wilson. One of the main components of this research is to integrate and analyze all previously gathered data, including artifacts, bone and palaeoenvironmental samples, and to organize past records. Another component is geoarchaeological coring and sampling of the deposits to gain a better understanding of the nature of the bone bed, the lacustrine deposits, aeolian sedimentation and local stratigraphic variability.

SUMMARY

Our initial thinking with respect to the duration of the First Albertans Project was that a five-year span would allow us to assess our general goals, the empirical results obtained, and theoretical outlook, and decide whether or not to continue. At this time, four years into the project, our goals and theoretical orientations remain essentially unchanged. The field results have helped in the continued refinement of our guiding principles and have yielded substantial evidence of prehistoric populations in the 7,000 to 9,000 year range – a time range of significant interest in its own right. It is clear that we can maintain a focus on this important issue without undue pressure on resources and that it is possible to combine other interests with this one. Public interest is substantial; radio and newspaper media request annual updates on progress and exhibit a clear understanding of the basic issues as well as the exploratory nature of the subject.

Penetration of the corridor region from the north, before 11,500 years ago, could have taken place in two different fashions: as a relatively continuous and sustained dispersal that took place over a longer period of time and involved relatively higher human population densities or as a short-term event, involving rapid travel through the corridor by small groups of people. It is certainly premature to attempt to choose between such alternatives, but the latter scenario must be borne in mind when devising search strategies. Evidence for very early use of the corridor may be scant and difficult to find; consequently, we hope to use innovative and systematic search techniques that will narrow the possibilities to those having the highest probability for preservation, access and discovery of early sites.

On present evidence, we believe that conditions within the corridor likely rendered it inhospitable for people between 20,000 and 14,000 years BP. The evidence from Bluefish Caves in the northern Yukon indicates that humans had occupied the ice-free areas of the Yukon and Alaska before 12,000 years ago, and quite likely, before 20,000 years ago (Morlan 1987). How sporadic or sustained this human presence may have been is open to conjecture, but it is intriguing that the Nenana valley research has not led to the discovery of archaeological evidence greater than 12,000 years of age (Powers and Hoffecker 1981:283). If it turns out that the more southerly, ice-free Americas were successfully settled prior to 14,000 years ago, we believe it is unlikely that the western corridor had a role to play (unless a southward human migration occurred prior to the late Wisconsin maximum). If such settlement did take place between 14,000 and 11,500 years ago, however, the western corridor region may very well contain traces of an early, rapid penetration by small groups of people.

BOW CORRIDOR PROJECT:
SUMMARY OF THE 1988-1989 RESEARCH

By
Barry Newton
Archaeological Survey of Alberta

RESEARCH DESIGN

The Bow Corridor Research Project is being undertaken within the First Albertans Project initiated by the Archaeological Survey of Alberta. The study incorporates much of the research design and methodology established by Ronaghan in the upper North Saskatchewan drainage system under permit 87-37 (Ronaghan and Beaudoin 1988a:193-194, 1988b:25-45).

The Bow Corridor (Figure 26) was chosen as a research area in part because of the presence of early prehistoric sites in the immediate vicinity. The Vermilion Lakes site (EhPv-8) and a number of other, slightly younger sites are located ca. 15 km to the west, in Banff National Park (Fedje 1986). In addition, three Clovis fluted points, one unfluted Clovis point and one "possible Midland point" were collected from the surface at site EhPv-1 on Lake Minnewanka in Banff National Park (Gryba 1988:[A2-3]-[A2-7]). Similarly, the early prehistoric Sibbald Creek site (EgPr-2) is located just east of the study area, at the eastern end of the Sibbald Pass which enters the Kananaskis Valley near its junction with the Bow River valley.

These finds effectively bracket the study area to both the west and east and suggest that the upper Bow River valley was used as a travel corridor to and from the mountains. Given the presence of early prehistoric sites at either end of the study area and the travel distance between known site locales, it is reasonable to assume that there will be traces of early sites here as well.

Site locational data from the Vermilion Lakes site provided geographic variables that were used in selecting promising locales for assessment. Based on existing information and site plotting on 1:50,000 NTS maps, the following variables were identified for the Vermilion Lakes site complex:

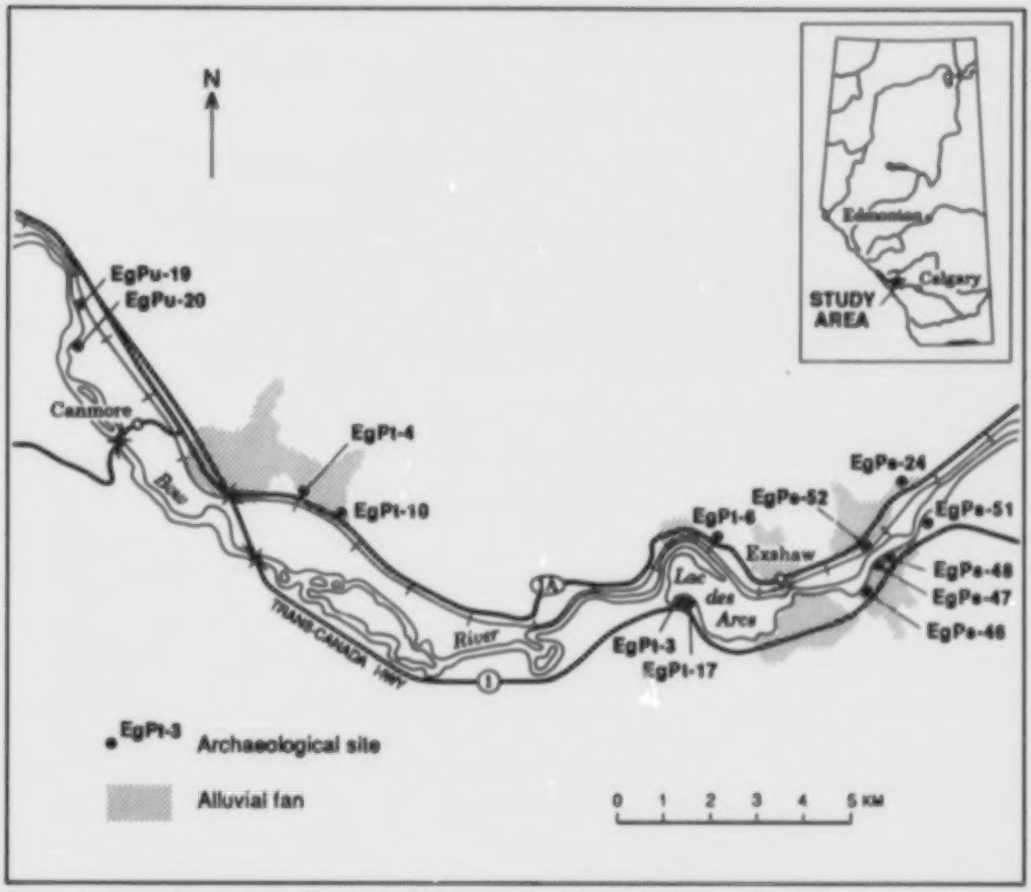

N
STUDY AREA
Edmonton
Calgary
EgPu-19
EgPu-20
Canmore
Bow
EgPt-4
EgPt-10
TRANS-CANADA HWY
River
1
1A
EgPt-6
Lac des Arcs
EgPt-3
EgPt-17
Exshaw
EgPs-24
EgPs-52
EgPs-51
EgPs-48
EgPs-47
EgPs-46
EgPt-3
Archaeological site
Alluvial fan
0 1 2 3 4 5 KM

Figure 26. Locational map of the study area and site distribution.

(1) The sites are located on alluvial fans formed where tributary streams enter the Bow valley from adjacent alpine valleys.
(2) The sites are on well-drained, gently sloping terrain.
(3) The sites are on the north (south facing) sides of lakes which may be the remains of a once larger lake.
(4) The earliest site deposits are deeply buried (ca. 2-2.5 m below ground surface) and lie within a silt/sand aeolian matrix overlain by alluvial/colluvial gravels that have sealed and preserved the lower deposits.
(5) The sites are multicomponent, with both pre- and post-Mazama Ash (ca. 6,700 years BP) occupations.

For the most part, initial site discovery in Banff park was the result of observing either surficial or near surface cultural deposits. Subsequent deep testing in the area of these later occupations led to the discovery of the earlier, more deeply buried occupations. Given the lack of distinct topographic features on the surface of alluvial fans in general and the large area (up to 2 sq. km) often covered by single or convergent fans, the presence of later occupations on fans in the study area may prove valuable in identifying potential areas for deep testing.

METHODOLOGY

Prefield air photo interpretation, combined with available site inventory data and the locational variables identified for the Vermilion Lakes site complex, were used to rank the alluvial fans identified by Rutter on his surficial geology map of the Banff to Morley flats area (Rutter 1972).

Initial field studies in 1988 involved examination (including limited shovel testing) of available exposures on alluvial fans. A number of previously recorded sites reported to contain either a Mazama tephra or deep depositional situations (EgPs-1, EgPt-3 and EgPu-3) were also reinvestigated in 1988 to determine if early cultural deposits were present at the sites.

The 1989 field season saw a continuation of the survey initiated in 1988, combined with a deep testing (backhoe) program on select sites identified in 1988 (EgPt-17, EgPs-47 and 48). Deep testing was also conducted on previously recorded sites which were considered to have potential for deeply buried cultural components (EgPt-4 and 6). A boat was used to survey river bank exposures from the Banff park boundary to the Kananaskis Falls at the eastern end of the study area.

RESULTS

Four new sites (EgPt-17, EgPs-46, 47 and 48) were recorded during the of the 1988 field season. Three previously recorded sites (EgPs-1, EgPt-3 and EgPu-3) were relocated and re-evaluated. In 1989, five new sites were recorded during the boat survey. Two sites (EgPu-19 and 20) were found in the vicinity of the Canmore Golf Course; both contain stratified, multicomponent, post-Mazama occupations. Three sites (EgPs-51, 52 and 53) were located below Lac des Arcs in the vicinity of site EgPs-48 (Figure

26). The following is a brief summary of the major sites and related radiocarbon dates.

HEART MOUNTAIN AREA

EgPs-46

EgPs-46 is a stratified, multicomponent site situated on the western edge of what we are calling the Heart Creek fan. The fan shows classic fan development, alternating layers of silt and cobbles. The site contains at least two cultural occupations, one at ca. 60 cm below surface and the other (which included a pit feature) at ca. 2.6 m below surface. No tephra was observed. A sample of bone from the pit was submitted for dating but contained insufficient collagen. No diagnostic artifacts have been found at the site; however, based on stratigraphy elsewhere on this fan (site EgPs-48), these occupations are expected to represent the Middle to Late Prehistoric periods (Figure 27).

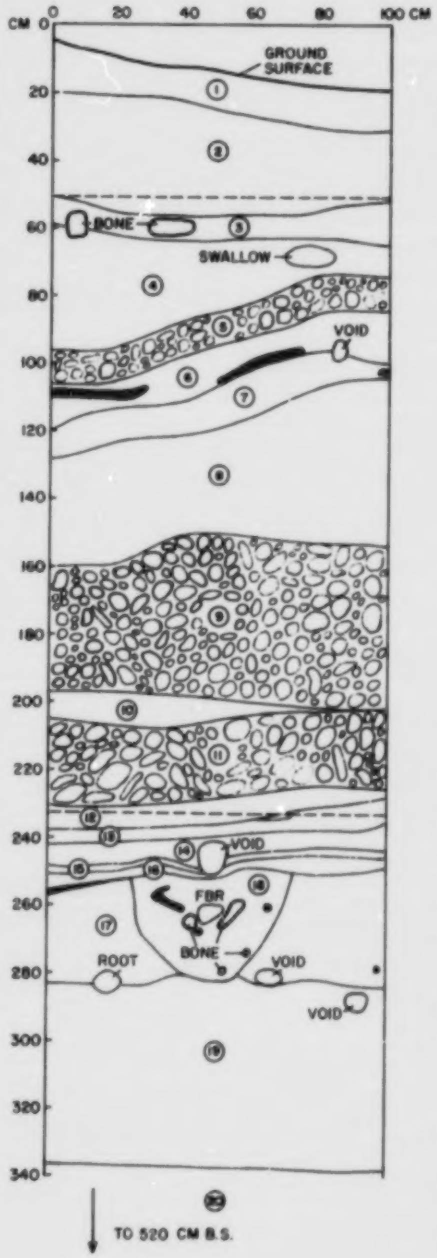
EgPs-47

This site is located on the same alluvial fan as EgPs-46 and 48, roughly midway between the two sites, at the apex of the fan's maximum extension into the Bow River. The depositional matrix of the portion of the site exposed on the river bank consists of massive deposits of aeolian silt (ca. 10-12 m) blown up against and over the actual fan.

The site was examined only briefly in 1988, but a trench cut into the slump near the base of the deposit exposed a presumed Mazama tephra about 6 m below ground surface. No cultural deposits were observed below the tephra; however, bone and FBR were observed above the tephra, scattered sporadically through four or five weak red/brown palaeosols. Backhoe testing (Backhoe Test 6) some 50 m inland and to the east of this exposure demonstrated the presence of slightly over 4 m of aeolian silt overlying the uppermost episode of fan gravel deposits.

EgPs-48

Of the new sites discovered in 1988, EgPs-48 was considered to be the most promising location for early cultural deposits. Initial investigations revealed a number of occupations exposed in the river bank at the toe of the


CM 0
0
20
40
60
80
100 CM
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
GROUND SURFACE
BONE
SWALLOW
VOID
FBR
BONE
ROOT
VOID
VOID
TO 520 CM B.S.

EqPs-46 SITE B

- ① Root mat - sterile
- ② Dark brown loose silt 10yr 4/2
- ③ Loose red silt with bone and charcoal. Light reddish brown 5yr 6/4
- ④ Mottled light grey silt with charcoal. Light brownish grey 10yr 6/2
- ⑤ Coarse sand/gravel
- ⑥ Light brownish grey 10yr 6/2 Charcoal. lens, flecks (very compact)
- ⑦ Light red/grey charcoal patches Light reddish brown 5yr 6/4
- ⑧ Mottled grey/pink charcoal compact Light brownish grey
- ⑨ Gravel/cobble with sandy lenses
- ⑩ Grey silt. Very pale brown 10yr 7/3
- ⑪ Gravel/cobble with sand
- ⑫ Mixed sandy coarse silt. Tan grey 10yr 7/2
- ⑬ Pinkish grey. Coarse sand compact 10yr 6/2
- ⑭ Light grey silt 10yr 7/2
- ⑮ Dark red 5yr 4/2
- ⑯ Light grey silt 10yr 6/2
- ⑰ Red-brown silt with bone and charcoal inclusions 5yr 5/3 (charcoal, bone sanded)
- ⑱ Hearth feature (charcoal, bone sanded). Light reddish brown 5yr
- ⑲ Light grey compact silt (mottled) white)
- ⑳ Light grey, loose sandy silt
- ● Charcoal

Figure 27. Profile of site EgPs-46.

fan. These included several occupations above the tephra, as well as a thick (ca. 60 cm), well-defined palaeosol below the tephra. The presence of small bone fragments in the palaeosol and its stratigraphic position below the tephra led to the decision to conduct limited test excavations on portions of the palaeosol covered by slump at the base of the erosion face.

These excavations demonstrated the presence of cultural material in the palaeosol which was subsequently dated to between 7,200 and 8,200 years BP. Samples from post-Mazama occupations exposed in the erosion face also provided a firm sequence of ordered dates of 5,720 years BP, 4,260 years BP and 3,170 years BP at depths of 2.31 m, 1.45 m and 1.15 m below surface, respectively.

Backhoe testing in 1989 confirmed the presence of the pre-Mazama palaeosol and associated cultural material over a wide area of the fan inland from the river bank. Additionally, backhoe testing confirmed the long-term use of the fan by later, post-Mazama occupations. A minimum of four occupations was identified. More refined excavation techniques may well demonstrate that these actually represent a much greater number of discrete occupations (Figure 28).

More importantly, deep testing confirmed that the fan contained evidence of earlier landforms, buried in deeper deposits inland from the river. A second palaeosol was identified in at least two of the backhoe tests (4 and 7), below the 7,000-8,000 years BP palaeosol and below ca. 60-80 cm of fan gravels. This palaeosol produced dates of 9,320 ± 390 years BP and 11,680 ± 250 years BP on sediment and charcoal samples. While no cultural material has been identified on this early landform as yet, its very presence is reassuring in that at least we have a surface on which early prehistoric people could have lived.

In terms of the Vermilion Lakes settlement model, EgPs-48 is on the opposite side of the river with a north (rather than south) facing aspect. The site does occupy an alluvial fan, however, and the intensity and duration of the occupation of this fan complement the results from Vermilion Lakes. Despite the absence of cultural material, this site still represents one of the best locations discovered to date, in terms of its potential to contain very early occupations.

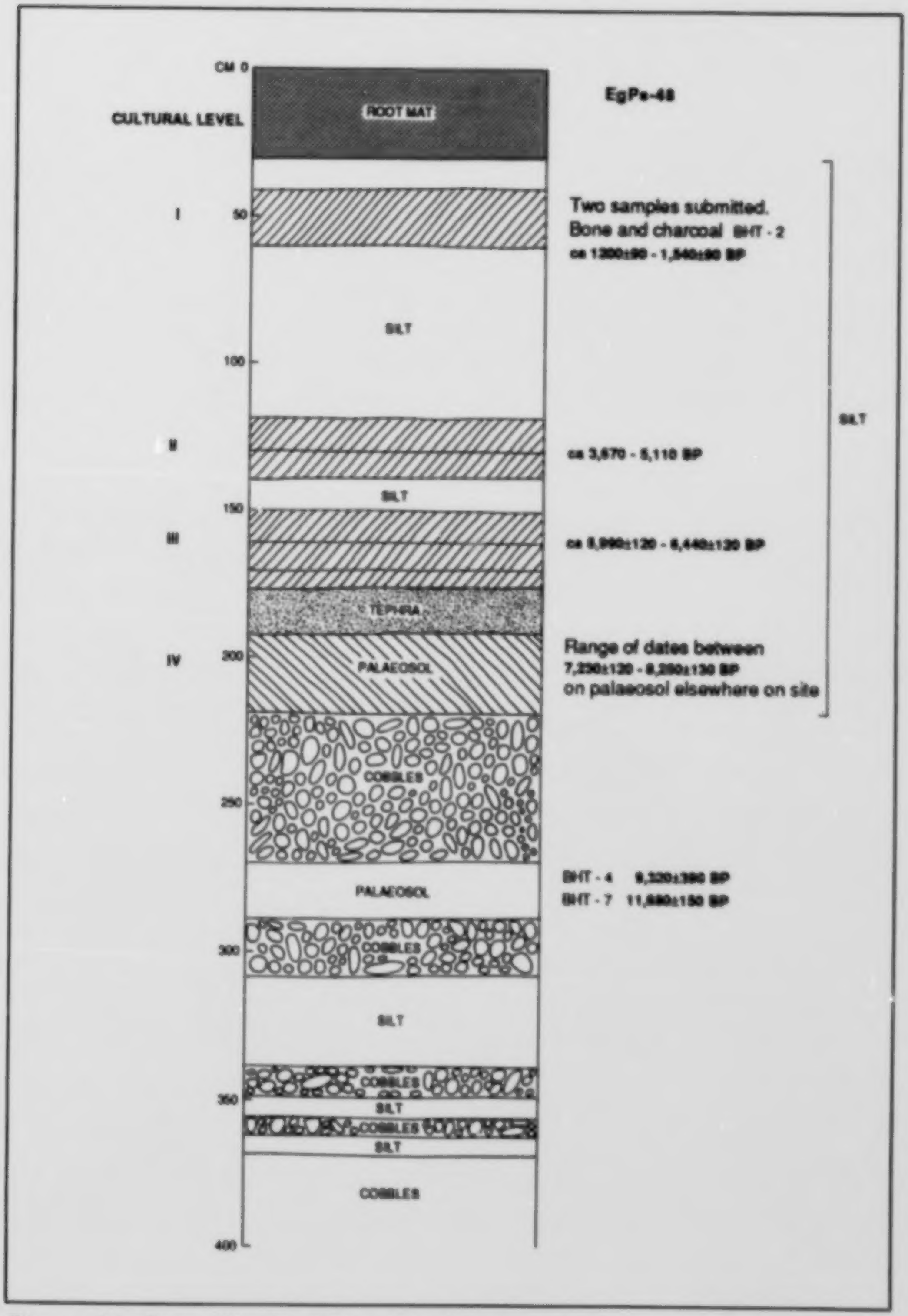

CM 0
EgPs-48
CULTURAL LEVEL
ROOT MAT
I
50
Two samples submitted.
Bone and charcoal BHT - 2
ca 1200±90 - 1,540±90 BP
SILT
100
SILT
II
ca 3,670 - 5,110 BP
SILT
150
III
ca 5,990±120 - 6,440±120 BP
TEPHRA
IV
200
PALAEOSOL
Range of dates between
7,290±120 - 8,290±130 BP
on palaeosol elsewhere on site
COBBLES
250
PALAEOSOL
BHT - 4 9,320±390 BP
BHT - 7 11,880±150 BP
300
COBBLES
SILT
350
COBBLES
SILT
COBBLES
SILT
COBBLES
400

Figure 28. Generalized profile of Backhoe tests 1, 2, 4 and 7, EgPs-48.

Based on findings from the backhoe test program, it may be feasible to combine sites EgPs-47 and 48. Site EgPs-48 lies roughly 500 m west of EgPs-47, but it would not be surprising to find interconnecting occupations.

EgPs-51

EgPs-51, a multicomponent buffalo kill in a spring deposit, was discovered on the south side of the Bow River, approximately 0.5 km downstream from EgPs-48. Four separate kill events were tentatively identified at the site. The earliest of these lies below a presumed Mazama tephra in approximately the same stratigraphic situation as the cultural occupations identified in the first palaeosol at EgPs-47/48 (Figure 29).

A bone sample from the pre-Mazama event returned a C-14 date of 7110 ± 160 years BP. This places the site well within range of the early occupations at EgPs-47/48. Bone samples from each of the later events also were submitted for dating, and the results are shown in Figure 29. Given the long-term use of this site, and of nearby site EgPs-47/48, it would not be unreasonable to expect a direct relationship between the kill and what could be the associated camp/processing area. A correlation between the dates from the later occupations at the kill and at EgPs-47/48 would help to confirm this assumption.

LAC DES ARCS

EgPt-3

EgPt-3 is located on the west side of a bedrock peninsula that extends north into Lac des Arcs from the south side of the lake. The site matrix consists of a deep deposit of wind-blown silts that have accumulated to a depth of over 4 m at the deepest part of the site. The site was recorded initially by Reeves and Malmberg (1977) who describe it as containing a multicomponent occupation above Mazama ash in a wind-blown silt matrix.

In 1988, a profile was cut into the slump at the base of the bank exposure to a depth of ca. 4.85 m. Bone and fire-broken-rocks were noted in five levels in the profile, four above the tephra and one below. Evidence of the pre-Mazama occupation, in the form of a disarticulated left hind limb of a bison, was found at 4.25 m below surface. A bone sample submitted to the

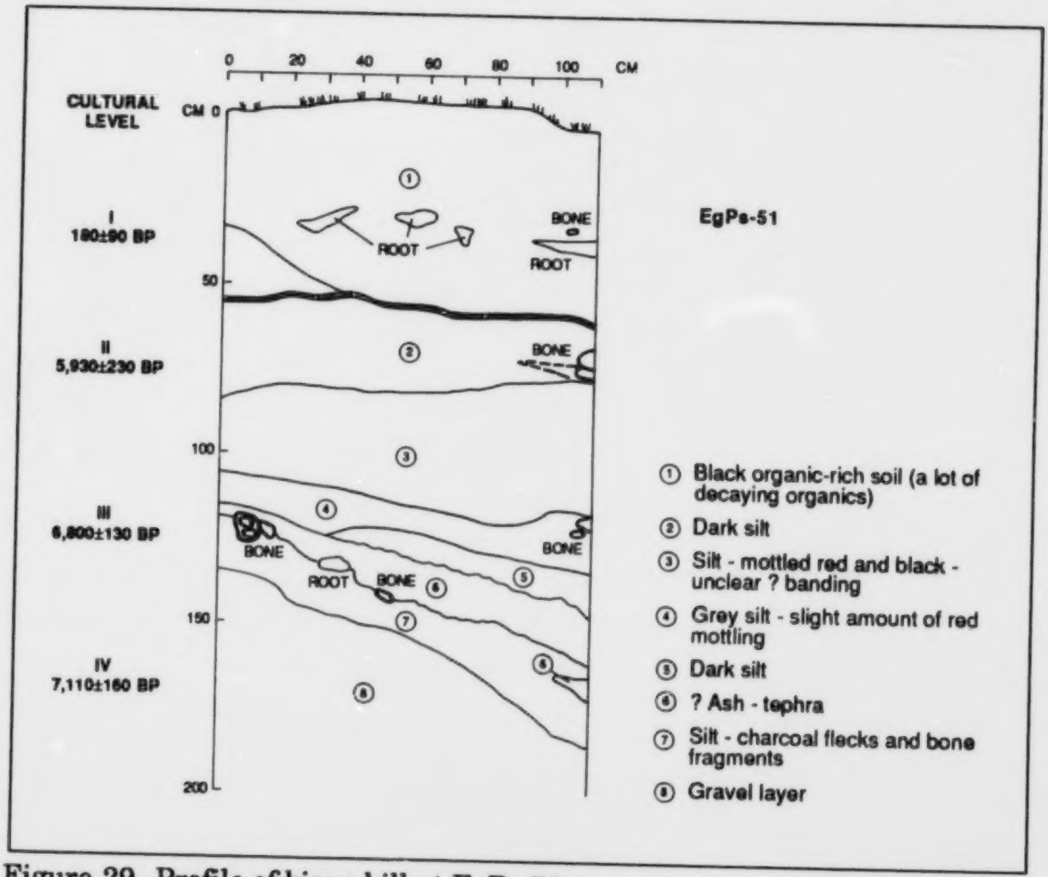

0
20
40
60
80
100
CM
CULTURAL LEVEL
CM 0
50
100
150
200
I
180±90 BP
II
5,930±230 BP
III
6,800±130 BP
IV
7,110±160 BP
①
②
③
④
⑤
⑥
⑦
⑧
ROOT
BONE
ROOT
BONE
BONE
BONE
ROOT
BONE
EgPs-51
① Black organic-rich soil (a lot of decaying organics)
② Dark silt
③ Silt - mottled red and black - unclear ? banding
④ Grey silt - slight amount of red mottling
⑤ Dark silt
⑥ ? Ash - tephra
⑦ Silt - charcoal flecks and bone fragments
⑧ Gravel layer

Figure 29. Profile of bison kill at EgPs-51.

Alberta Environment laboratory in Vegreville returned a date of 7,810 ± 120 years BP, within the range of the earlier dates from the palaeosol at EgPs-48. No artifacts were associated with this bone, but given the presence of cultural material in a similar deposit in adjacent EgPt-17, a cultural origin for the bone would not be improbable. Developed palaeosols containing bone fragments and FBR were observed adjacent to and south of the profile area. These also were situated below the tephra layer. Samples of the tephra were collected for analysis. Examination of the sample has indicated that it is a tephra; however, assignment to a specific event is less certain (Beaudoin, this volume).

While no lithic artifacts were recovered from the profile, a single, small, corner-notched projectile point, manufactured on a grey quartzite flake, was found in situ to the north of the profile area. The point was recovered from a grey/brown silt horizon ca. 58 cm below ground surface and is tentatively identified as a small Pelican Lake variety.

EgPt-17

EgPt-17 is situated on the same peninsula as EgPt-3, but it is further east, on the opposite or leeward side of the bedrock spine which forms the peninsula. Shovel testing in 1988 revealed a prehistoric occupation at a depth of ca. 50-60 cm below surface in aeolian silts. Because of the absence of exposures at EgPt-17, it was not possible to determine either the total depth of these silt deposits or if they contained multiple occupations, but it was expected that they would be at least as deep as those observed at EgPt-3.

In 1989, three backhoe tests were excavated at this site. The deepest test (Backhoe Test 1) revealed over 4 m of aeolian silts overlying a sand and gravel deposit (Figure 30). Four occupations were identified in the deposit, two above tephra and two below. Again, a weak palaeosol was observed below the tephra, but no cultural material was observed in this palaeosol. Two occupations were identified in a stratigraphic position below the palaeosol (Figure 30). A bone sample from Cultural Level 3 was submitted to Beta Analytic Inc. and returned a date of 6720 ± 80 years BP (Beta 37840). A small sample of bone from the lowest occupation (Cultural Level 4) has been sent to Isotrace Laboratory Analytical Services, and we are awaiting a date from this sample.

EgPt-6

EgPt-6 is located on the north side of Lac des Arcs in a silt-filled bedrock basin well above the present lake level. The site was discovered initially by Reeves and McCullough in 1976 (Reeves and McCullough 1976) and was evaluated subsequently by Quigg in 1977 (Quigg 1978:82-93). Quigg's evaluation of the site involved eight random shovel tests, three auger tests to depths of ca. 110 cm below surface, and the excavation of a 2 x 4 m unit. Quigg identified a single, culture bearing strata at a depth of ca. 12-30 cm below surface. On the basis of a Pelican Lake Point and a collagen date of 370 ± 75 years BP, Quigg determined the site to be a single component campsite, dating to the Pelican Lake Phase of the Middle Prehistoric Period (Quigg 1978:88). Quigg also noted the presence of

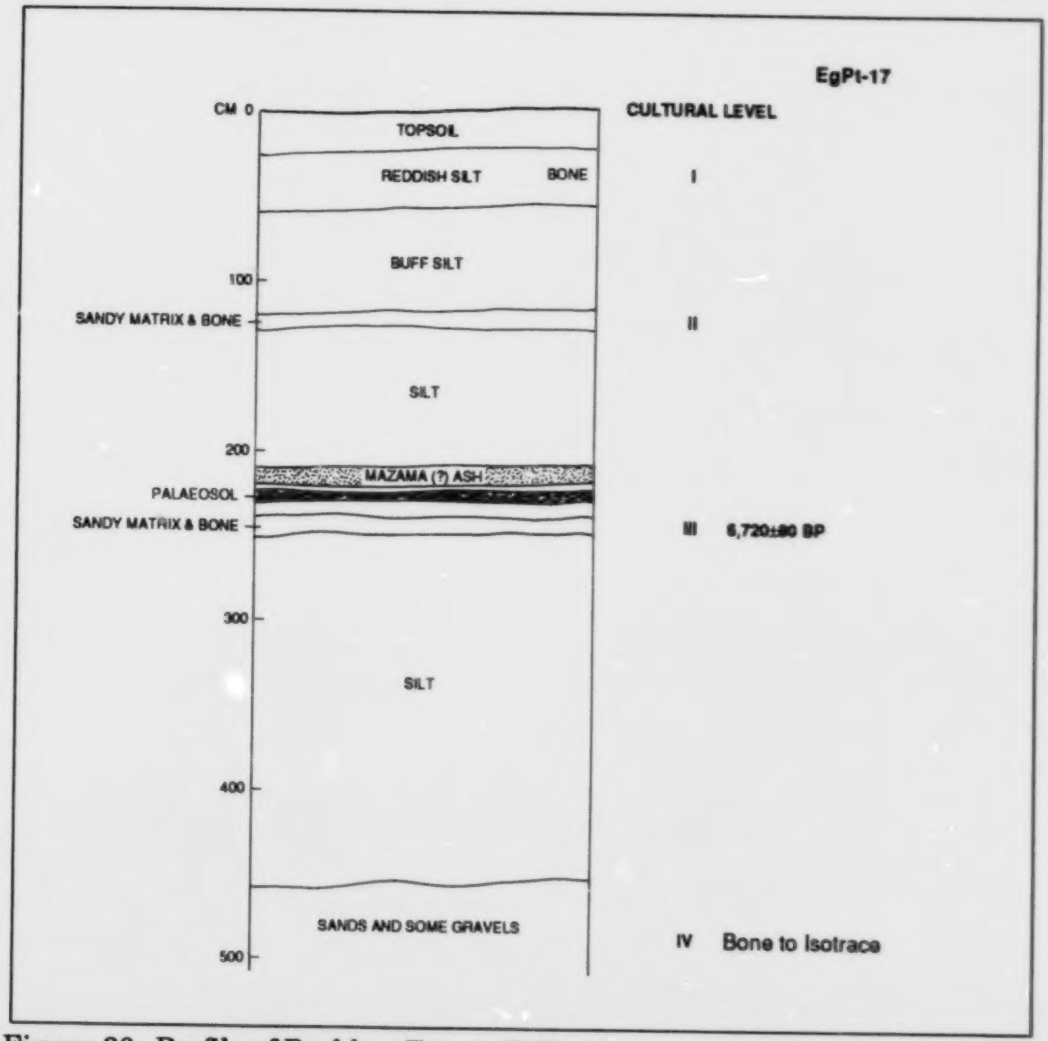

EgPt-17
CM 0
CULTURAL LEVEL
TOPSOIL
REDDISH SILT
BONE
I
BUFF SILT
100
SANDY MATRIX & BONE
II
SILT
200
MAZAMA (?) ASH
PALAEOSOL
SANDY MATRIX & BONE
III
6,720±80 BP
300
SILT
400
SANDS AND SOME GRAVELS
IV
Bone to Isotrace
500

Figure 30. Profile of Backhoe Test 1, EgPt-17.

Mazama Ash at a depth of ca. 55 cm below surface, but he did not discover any cultural material below the tephra.

The site was visited in 1989, and the tephra reported by Quigg was evident in a substantial matrix of aeolian silts in the old Highway 1A roadcut. Inspection of the cut led to the discovery of a single, large fragment of bison. Numerous flakes, bone fragments and fire-broken rocks were observed scattered in gopher mounds over a large area of the basin occupied by the site. Because of the amount of deposition evident in the

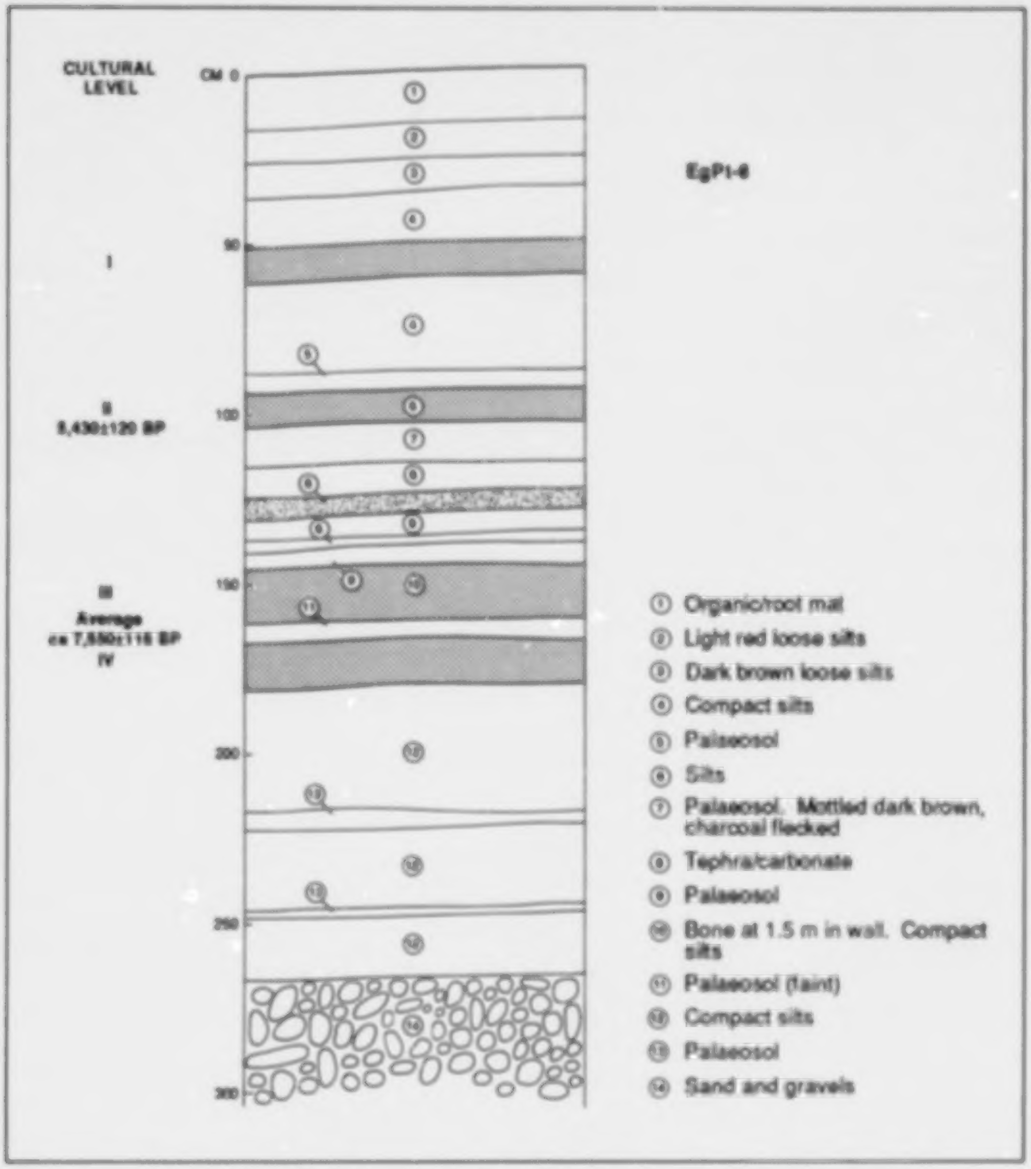

CULTURAL LEVEL
CM 0
50
100
150
200
250
300
I
II
5,430±120 BP
III
Average
ca 7,550±115 BP
IV
EgPt-6
① Organic/root mat
② Light red loose silts
③ Dark brown loose silts
④ Compact silts
⑤ Palaeosol
⑥ Silts
⑦ Palaeosol. Mottled dark brown, charcoal flecked
⑧ Tephra/carbonate
⑨ Palaeosol
⑩ Bone at 1.5 m in wall. Compact silts
⑪ Palaeosol (faint)
⑫ Compact silts
⑬ Palaeosol
⑭ Sand and gravels

Figure 31. Profile of Backhoe Test 4, EgPt-6.

basin and the presence of material both above and below the tephra, limited backhoe testing was undertaken.

Of the five backhoe tests scattered across the site area, three produced cultural material in quantity below the tephra. Three bone samples from Backhoe Test 4 were submitted for dating and returned dates of 7,810 ± 120 years BP, 7,460 ± 110 years BP and 7,380 ± 120 years BP (mean = 7,550 ± 116 years BP). There appear to be at least two post-Mazama occupations at the site (Figure 31); one of these (Cultural Level 2) has been dated to 5430 ± 120 years BP. Although no additional cultural deposits were observed below the dated horizon, there are indications of additional palaeosols which could have provided stable land surfaces for even earlier occupations.

SUMMARY AND CONCLUSIONS

To summarize, two summers of field work in the Bow Corridor have confirmed, in part, our initial settlement pattern model, demonstrating the presence of stratified, deeply buried campsites which span a time period from at least ca. 8,000 years BP to the Late Prehistoric Period. A palaeosol identified on an alluvial fan has been dated to between 9,300 and 11,680 years BP. Given the evidence at the Vermilion Lakes site, this palaeosol has at least the potential to contain evidence of very early occupations.

Five stratified multicomponent sites, which contain basal components dating to between 7,000 and 8,000 years BP, have been identified in two separate areas of the corridor. One area is centered on Lac des Arcs, and the other is on or in close proximity to the Heart Creek alluvial fan.

At best, the two short seasons of field work in the Bow Corridor have just touched upon the archaeological potential of this area. While it is true that discovering very early cultural remains here may be like finding a needle in a haystack, at the very least we are now searching a much smaller, quite familiar haystack.

NEW STUDIES AT THE FLETCHER PALAEO-INDIAN BISON KILL (ALBERTA/SCOTTSBLUFF), SOUTHERN ALBERTA

By
Michael Clayton Wilson, University of Lethbridge,
J. Roderick Vickers, Archaeological Survey of Alberta,
Arthur C. MacWilliams, University of Maine,
Alwynne B. Beaudoin, Archaeological Survey of Alberta
and Ian G. Robertson, University of Calgary

The Fletcher site (DjOw-1) is located about 50 km SSE of Taber on the dry plains of southern Alberta (Figures 32 and 33). It lies in an upland setting less than 3 km north of Chin Coulee, a major east-west meltwater channel incised during early deglaciation of the area. The site was discovered as a result of keen vigilance by Armin Dyck, one of Alberta's most conscientious amateur archaeologists. The site was revealed in 1963 after excavation of a cattle watering dugout at a locality where a spring had long been noted. Archaeological excavations in 1963 and 1964 by Richard G. Forbis and Brian O. K. Reeves yielded Alberta and Scottsbluff projectile points and revealed an extensive bed of bison bones more than 2 m below surface, confirming that this was an important Palaeo-Indian bison kill (Forbis 1968, 1970; Wormington and Forbis 1965). Although excellent descriptions of the artifacts have been published, bone bed studies per se were not undertaken, and only a preliminary outline of stratigraphy was presented. Attempts to obtain a radiocarbon date on bone were unsuccessful.

In 1975, J. Michael Quigg of the Archaeological Survey of Alberta excavated additional test pits at the site to assess the extent of the bone bed and to collect datable material. Samples of unburned bone were submitted for radiocarbon dating but again yielded unacceptable, widely varied results (Quigg 1976; Vickers 1986:44). The site was monitored by Archaeological Survey of Alberta personnel during periodic "mucking out" of the dugout to enhance water flow, and additional bones and artifacts were recovered.

In 1985, M. C. Wilson profiled a 7 km pipeline trench that crossed Chin Coulee and extended into the upland not far south of the site. This

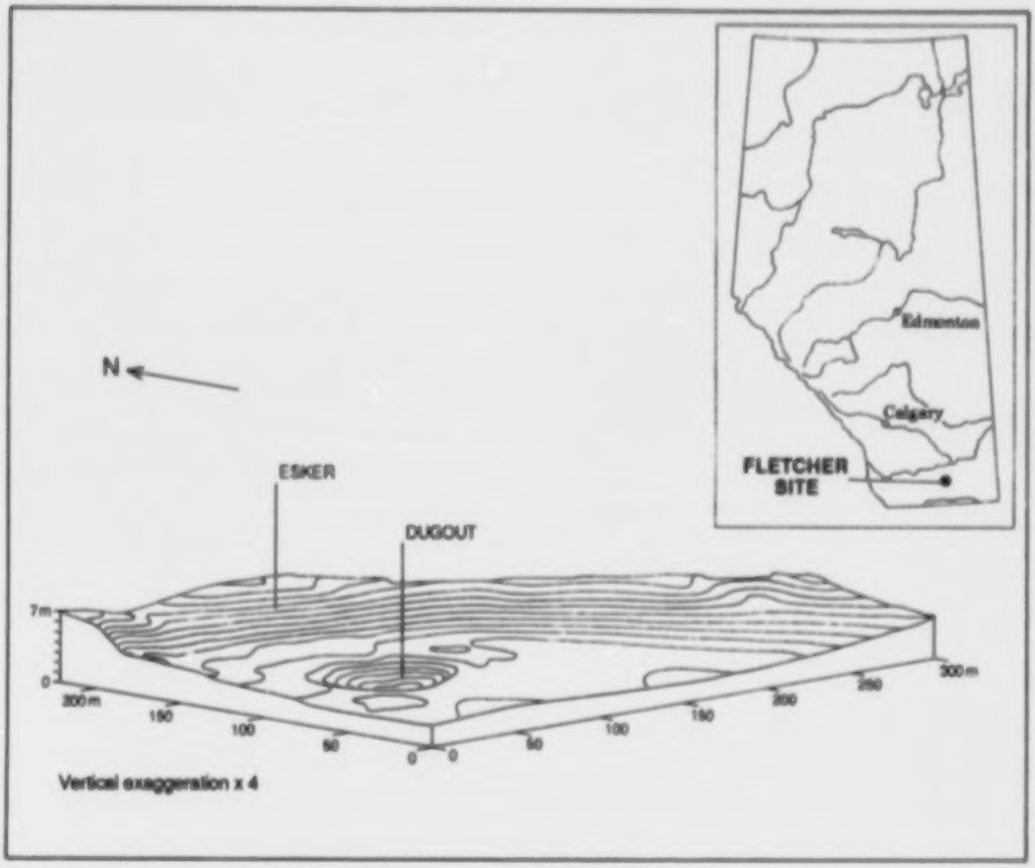

N
ESKER
DUGOUT
7m
0
200m
150
100
50
0
0
50
100
150
200
250
300m
Vertical exaggeration x 4
Edmonton
Calgary
FLETCHER SITE

Figure 32. Location of the Fletcher site (DjOw-1) and oblique view of the site showing relationship of site (at and around dugout) to esker-like ridge.

profile yielded information relevant to the geoarchaeology of the site. The trench revealed an undulating till surface beneath post-glacial silts and sands, providing a possible explanation for the perched water table at the Fletcher site (Wilson and MacWilliams 1987). Sediment samples from around the dugout were collected and analyzed by MacWilliams (1986; see also Wilson and MacWilliams 1987) to provide information on the textural and chemical characteristics of strata from the bone bed upward. MacWilliams also discovered that the bone bed was rich in seeds of aquatic or wetland plants, revealing new potential at the site for palaeoenvironmental analysis (MacWilliams 1986).

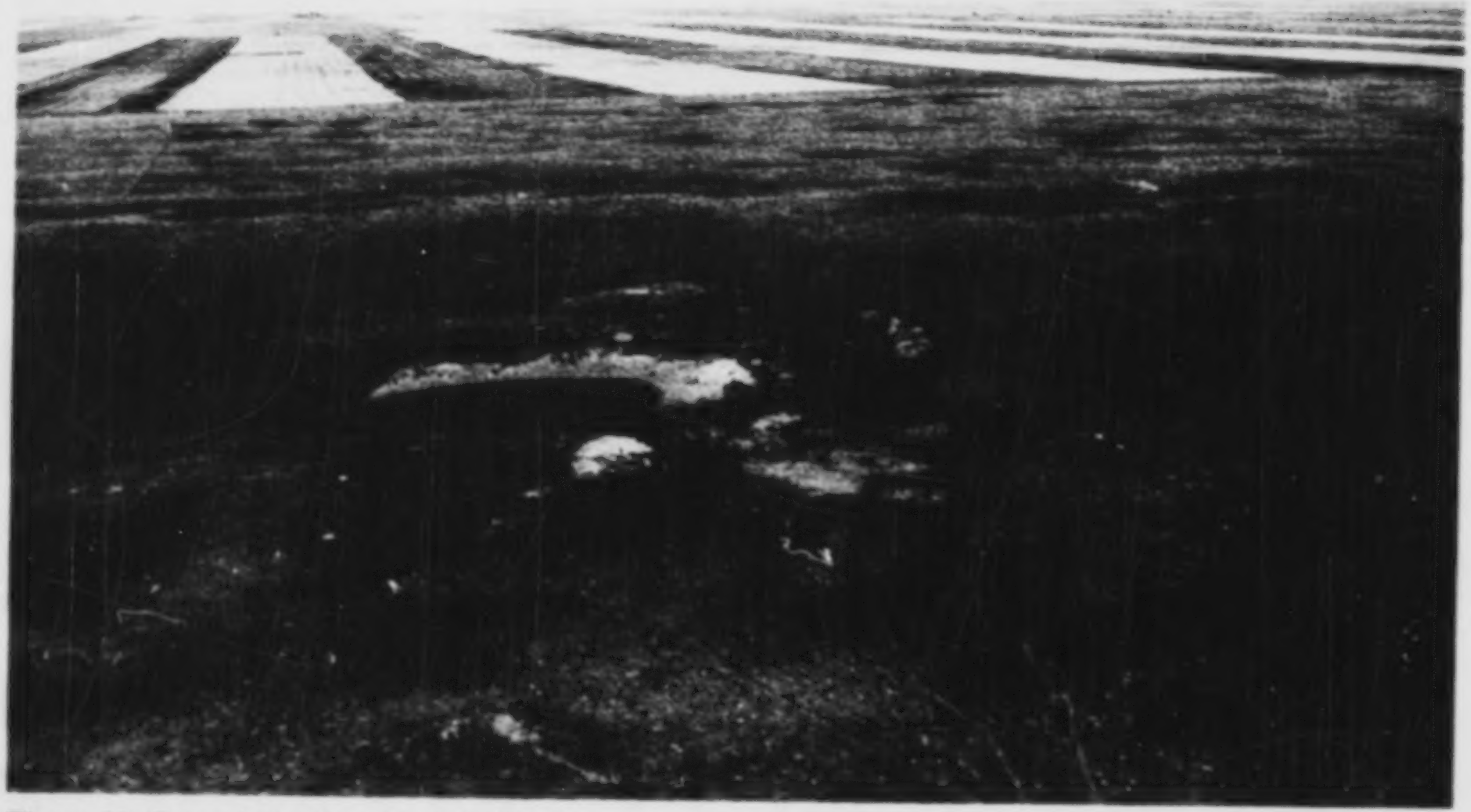


Figure 33. General view (north) of the Fletcher site.

In 1987 and 1988, J. R. Vickers of the Archaeological Survey of Alberta excavated another test pit to clarify stratigraphic relationships and to recover additional cultural material. Lithic artifacts were not recovered, but a dense bone bed was encountered (Figure 34), and a rich macrofossil assemblage, including gastropods, ostracodes, seeds, and plant stem fragments, was obtained (Steinhauser 1988, this volume). The site was sampled by Rene W. Barendregt (University of Lethbridge) for palaeomagnetic studies of sediments, and a monolith was obtained for laboratory stratigraphic and pedological studies. Neutron activation analysis was conducted on bone and soil samples by Allan Gray (Gray 1987; Gray et al. 1988) and indicated the presence of enhanced levels of manganese in the bone. Sampling of seeds, probably of sedge (*Cyperaceae*), by A. B. Beaudoin allowed AMS radiocarbon dating of deposits just below the bone bed, giving a date of 9,380 ± 110 years BP (TO-1097; Vickers and Beaudoin 1989). Based on the occurrence of both Alberta and Scottsbluff points, a date shortly after this is expected for the bone bed itself, probably on the order of 9,000 years BP or more (Vickers and Beaudoin 1989; see also Wilson and MacWilliams 1987).

The bone bed rests in the uppermost strata of a lacustrine sequence of unknown depth (Figure 35). A coring program was initiated in 1989 to characterize the deeper horizons. At the time of the kill, the site was probably a small lake or pond localized in a till depression immediately south of a sinuous esker-like ridge (Figures 32 and 33). A sequence of aeolian sands is above the bone bed (Figure 35); their environment is inferred on the basis of particle size statistics and grain frosting. These sands range in age from early Holocene to the present century. Load-cast flame structures along the lacustrine/aeolian boundary indicate that the lake disappeared through infill rather than dessication; thus, the lacustrine sequence has not been truncated. In effect, the lake is still there in the form of a groundwater reservoir perched in the same till depression. Therefore, the lacustrine sequence holds great promise of providing an early post-glacial and early Holocene palaeoenvironmental record. The overlying aeolian sediments display unconformities and likely document Hypsithermal conditions in part; however, the Mazama tephra (ca. 6,850 years BP; Bacon 1983), widespread in the general area, has not yet been found at the site.

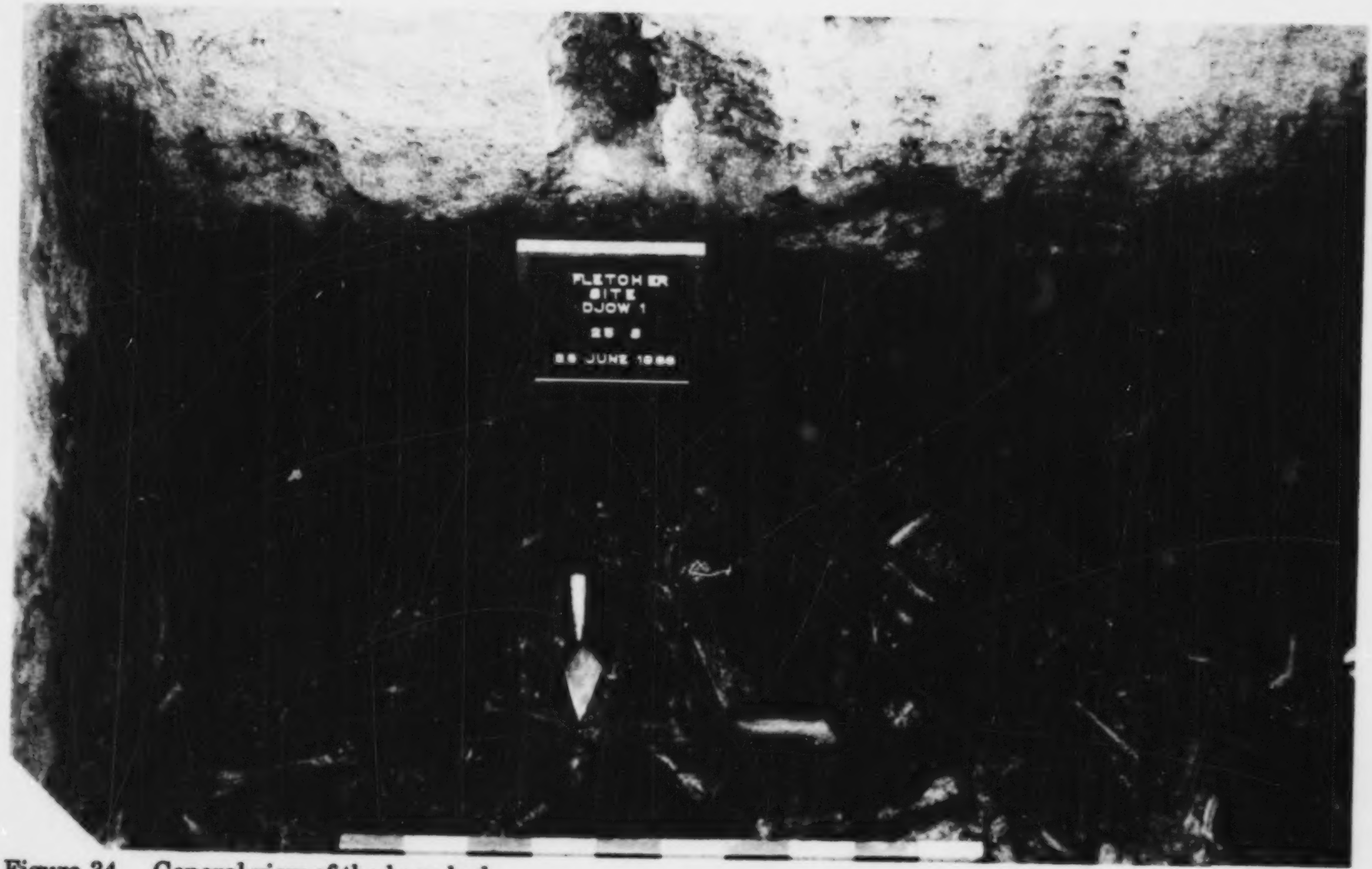

FLETCHER
SITE
DJOW 1
JUNE

Figure 34. General view of the bone bed.

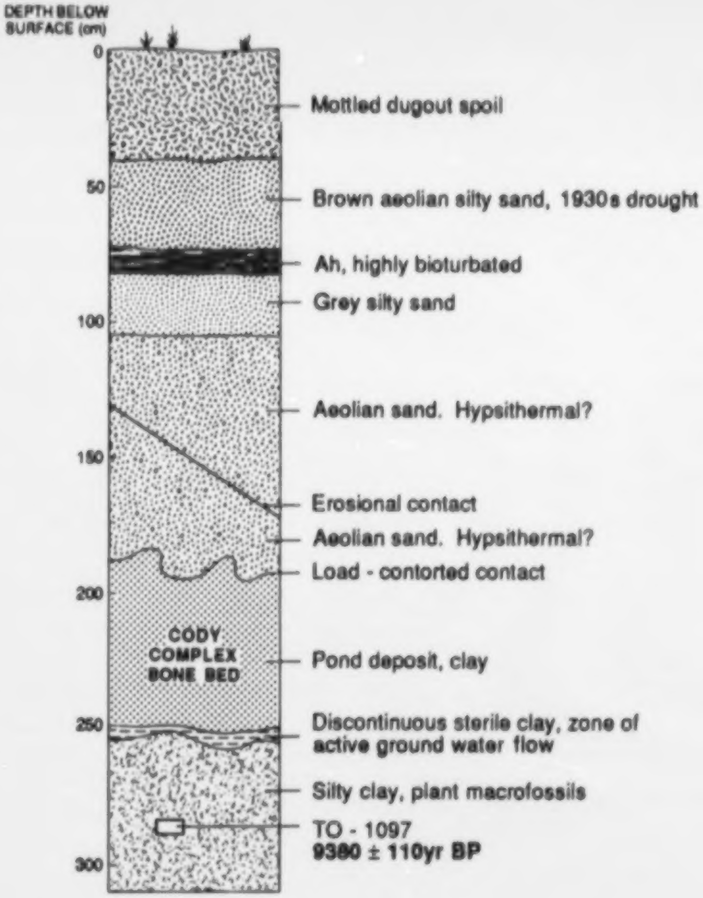

DEPTH BELOW SURFACE (cm)
0
50
100
150
200
250
300
Mottled dugout spoil
Brown aeolian silty sand, 1930s drought
Ah, highly bioturbated
Grey silty sand
Aeolian sand. Hypsithermal?
Erosional contact
Aeolian sand. Hypsithermal?
Load - contorted contact
CODY COMPLEX BONE BED
Pond deposit, clay
Discontinuous sterile clay, zone of active ground water flow
Silty clay, plant macrofossils
TO - 1097
9380 ± 110yr BP

Figure 35. Schematic profile showing stratigraphy of the Fletcher site as revealed in 1987/1988 test unit (after Vickers and Beaudoin 1989).

Given the presence of load-cast contortions, it is possible that multiple, closely spaced bone beds have been mixed after burial. This possibility can be tested only through further excavations. A long-term research project is underway and includes members of a joint University of Lethbridge/ Archaeological Survey of Alberta team directed by Wilson and Vickers. Studies already underway, in addition to those noted above, include identification of plant macrofossils and pollen analysis by Beaudoin and analysis of vertebrate specimens by Wilson. The palaeomagnetic samples are being studied by Barendregt and Wilson as indicators of the degree of bioturbation and sediment convolution. In addition, scanning electron microscope studies of bison teeth are being undertaken by Wilson to assess the effect of diagenesis on enamel prism patterns as part of the parallel study of the use of mammalian enamel prism patterns as a technique for identification of fragmentary material.

The Fletcher site is not seriously threatened by development, although minor impact is occasioned by periodic "mucking out" of the dugout to enhance spring flow. The main focus of the ongoing research is not expanded excavations but the assembly of recovered materials and the amalgamation of all records into a single database, which is being compiled by I. G. Robertson. It is intended to produce a volume summarizing the current state of knowledge concerning this important site.

ACKNOWLEDGEMENTS

We thank Armin Dyck, Dick Forbis, Barney Reeves and Archie Stalker for providing information about the discovery and early excavations. Bruce Fletcher graciously gave permission for the field work to be conducted on his land, and Doug and Marence Fletcher assisted the excavation crew in many ways. Funding for the database and ongoing projects has been provided by a Social Sciences and Humanities Research Council of Canada grant to M. C. Wilson, while funding for the 1987-1988 excavations was provided by the Archaeological Survey of Alberta, Alberta Culture and Multiculturalism.

RECOVERY OF FINE FRACTIONS:
THE FLETCHER SITE (DjOw-1)

By

Robert A. Steinhauser

INTRODUCTION

The Fletcher site, DjOw-1, is an Early Prehistoric bison kill and processing site located on the dry southern Alberta plains just north of Chin Coulee (SE-NW-27-7-14-W4M; see Wilson et al. this volume). The only known major buried deposit of the Alberta/Cody complex in the Alberta plains, the site appears to represent a warm season kill of bison watering at a spring (Forbis 1968; Vickers 1986:41; Wormington and Forbis 1965).

Work conducted at the site in 1987 and 1988 by the Archaeological Survey of Alberta was designed to examine the stratigraphy in detail, secure new samples suitable for C-14 dating, and recover any possible palaeoenvironmental indicators (Vickers, personal communication 1988). As part of this project, I was contracted to undertake initial processing of bulk soil samples from the Alberta/Cody horizon and to assess the value of fine fraction returns. This paper documents the results of that project.

PREVIOUS RESEARCH

The Fletcher site was discovered in 1963 by Armin Dyck, a local amateur archaeologist, who reported the site to Richard G. Forbis, then of the Glenbow Foundation. Forbis conducted initial test excavations in July of that year. Major excavation was undertaken in 1964 by a crew under the supervision of B. O. K. Reeves. This work resulted in the only major report of the site in the archaeological literature (Forbis 1968).

Further investigation of the Fletcher site was undertaken by J. Michael Quigg of the Archaeological Survey of Alberta in 1975 (Quigg 1976). Quigg's research was designed to discover the limits of the site and to secure samples for C-14 dating. A total of five 2 x 2 m units was excavated, and a number of bone specimens were submitted for dating. These resulted in dates ranging from 1675 ± 145 years BP to 7655 ± 110 years

BP (see Vickers 1986:44). It is apparent from both the range of dates secured and the ca. 9,000 year old date for the Alberta complex Hudson-Meng site in Nebraska (Agenbroad 1978) that this portion of the project was unsuccessful.

Arthur MacWilliams and Michael Wilson collected sediment samples from the exposures along the dugout for MacWilliams' honours B.A. thesis project in 1985 (MacWilliams 1986). Although this work provided some clarification of sedimentology, a continuous stratigraphic column spanning the complete sedimentary record could not be exampled. The discovery of small seeds within the outcropping Alberta/Cody horizon was of particular interest as a source of palaeoenvironmental information.

In the summers of 1987 and 1988, excavation of 4 sq. m was undertaken at the Fletcher site by a crew from the Archaeological Survey of Alberta under the direction of J. Rod Vickers. The project provided a general description of the site stratigraphy, a sample of bone from the Alberta/Cody horizon, and a number of projectile points (although the latter are out-of-context, surface discoveries; Vickers, personal communication 1988). Most importantly, the project encountered the Alberta/Cody materials within a thick clay deposit, which suggested that organic remains might well be preserved. A detailed description of the stratigraphy of the Fletcher site can be found in Wilson et al. (this volume).

METHODOLOGY

The Alberta/Cody horizon was excavated in a series of arbitrary 10 cm levels, and all soil matrix was reserved for processing in the laboratory. In total, 30 large soil matrix samples were taken from three levels in which Cody Complex material occurred. These samples were later divided into 1 litre subsamples, some of which were reserved for future analysis. Thirty 1 litre samples form the subset analyzed here. Several methodological approaches were considered, the most practical of which was water washing through a nest of sieves of sufficient size to catch such fine remains as small seeds, ostracodes, insect parts, and so forth.

Five of the thirty 1 litre soil samples were selected for initial processing. These samples represented all Cody Complex levels and both quadrants of the excavation unit (levels 22 NW, 23 NW, 24 NW, 23 NE and 24

NE). From each of these, 100 ml was extracted, soaked in a water bath for approximately 8 hours to defloculate the sediments, and then washed through a nest of sieves (Table 5). A garden hose with nozzle attachment set to fine spray at low volume was used to facilitate movement of the sediment through the screens.

Table 5. Geological sieve sizes and U. S. series equivalents.

Metric Size	U. S. Series
3.35 mm	6
850 microns	20
425 microns	40
150 microns	100

All of the 100 ml samples were allowed to dry in the sieves. A dryer was constructed using a small cardboard box with a circular cutout at the top to take the nest of sieves. A hair dryer was used as the heat source. An attached hose forced warm air into the side of the box and through the sieves at the top. Once drying was complete, the sieves were swirled while they were nested for final sieving.

Sorting of the three finest fractions was done on a plastic petri dish on which a 1 cm grid was inscribed. A 000 sable paint brush was found to be most effective in removing specimens from the petri dish stage; however, a problem was encountered due to a build-up of static charge. This was solved to a great degree by attaching copper strips to two edges of the dish and grounding it to a water pipe. As well, samples were set on a grounded metal plate prior to sorting to drain off the accumulated charge. Even so, sorting through the finest component caused small charges to build and made picking up specimens difficult and time consuming.

While drying the two finest fractions, we noticed that, if care was not taken to cover the sieve with doubled over cheese cloth, much of the lighter material in the sample, including ostracodes, would float out of the screen on the rising column of heated air. This suggested that "winnowing" of the finer material from the remaining fine sand matrix might be possible. In order to test this methodology, a device was constructed using a length of 2 inch rigid plastic tubing as a winnowing chamber (Figure 36). A stage constructed of fine mesh of a size smaller than 150 µm, glued to a plastic ring of sufficient size to fit snugly inside the base of the tube, supported the sample. The hair dryer and hose again supplied the air. The gleaned material was to be drawn off by vacuum through a water filter by means of 7/16 inch (inside diameter) flexible, transparent plastic tubing. Unfortunately, this size tubing proved to be inadequate and caused back pressure to the dryer. Again, unwanted static charges resulted in winnowed material clinging to the interior walls of the apparatus despite the grounding. Thus, while the winnowing portion of the experiment was partially successful, the apparatus was unable to completely draw off the fine fraction of interest. The experiment was not sufficiently successful to merit further refinement.

In the end, static build-up suggested a method for gleaning the finest fractions. If the sieves were not immediately emptied after drying, a high percentage of the lightest remains in the finest fractions, composed of whole and fragmentary ostracodes, gastropods and other tiny shell fragments, accumulated on the sieve walls due to static charge. After the detritus in the bottom of the sieves was decanted, and the individual sieves were allowed to rest for a few minutes on a grounded metal plate, the material adhering to the sieve walls could be brushed off easily. The resulting concentrate contained nearly all the small molluscs in the fine sieves, albeit along with a proportion of unidentifiable fragments.

After the 100 ml samples had been sieved and the contents separated, the original 30 samples (twenty-five 1 litre and five 950 ml) were processed. These were handled somewhat differently than the 100 ml samples. Due to the presence of a varying proportion of unreduced clay balls in the sieved small samples, trisodium phosphate was added to the soaking water to act as a defloculant. When the soaking period was complete, the sample was mixed to a slurry. Stirring the soaking samples caused some of the plant materials to float to the surface when they were released from the matrix. This floating fraction, including most of the plant parts and fibres, many seeds, some insects and a few molluscs, was skimmed off from most of the samples. The slurry was then washed through the screens as usual. Because of the greater relative amounts of sieved material, drying of these fractions was accomplished by decanting the contents of each sieve onto an

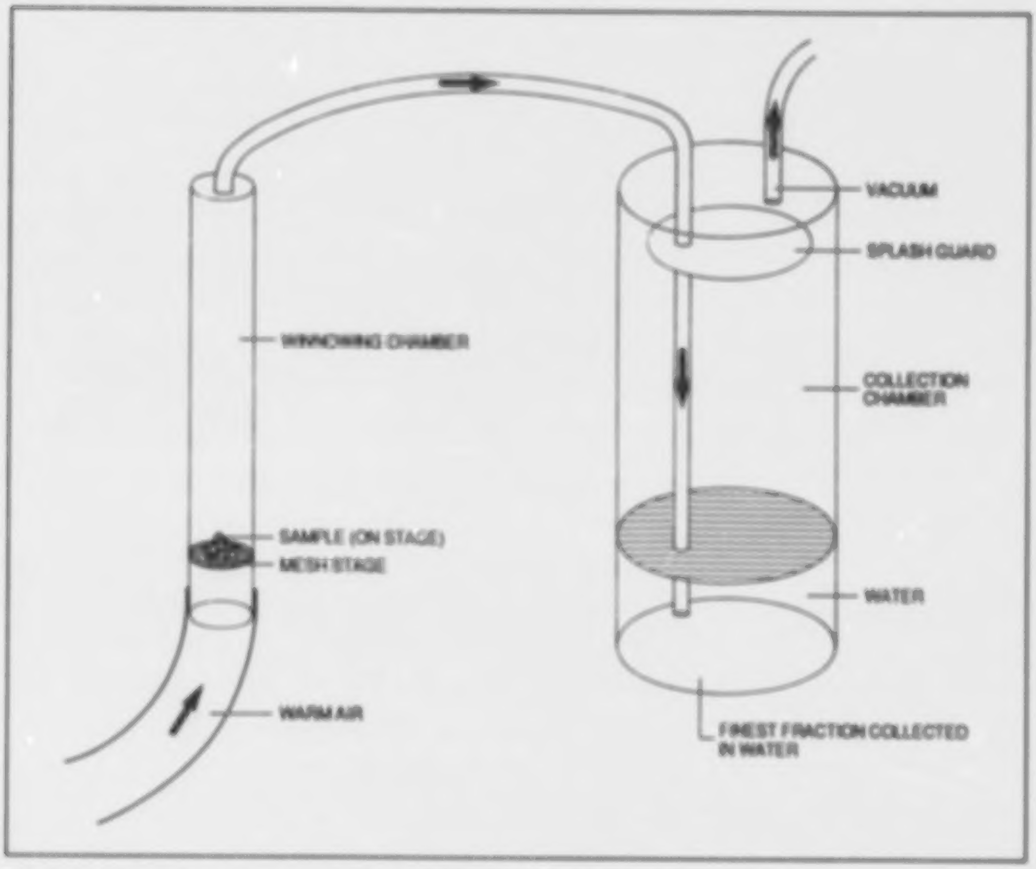

VACUUM
SPLASH GUARD
WINNOWING CHAMBER
COLLECTION CHAMBER
SAMPLE (ON STAGE)
MESH STAGE
WATER
WARM AIR
FINEST FRACTION COLLECTED IN WATER

Figure 36. Experimental winnowing apparatus.

opened newspaper section, which was then folded into a package, taped and labelled (Watson 1975). These were then set in a sunny location to dry. The 1 litre samples were not completely sorted; only the fractions retained by the 3.3 mm sieve and those retained by the 850 µm sieve were gleaned.

RESULTS

The samples for processing were secured from a number of provenience units, all were derived from the northern 1 x 1 m quadrants (northeast and northwest). The samples include one from the upper bone bed (level 22N) in the NW quadrant only and samples from both quadrants in levels 23N and 24N. The weights of dry processed fractions are indicated below (Table 6). The coarsest sieve contained 11% (by dry weight) of the total fine fraction recovered, while the others contained 6.2%, 26.6% and 56.1% of the material, respectively. Larger bone fragments account for much of the weight in the coarsest sieve fraction. A large proportion of fine sand grains composes the greatest weight in the two finest sieves.

The sample of materials recovered in the process of graduated sieving was observed to have some general properties. Typically, the heavier fraction recovered in the coarsest screen size (3.35 mm) contained a few identifiable elements and fragments, larger unidentifiable bone fragments, a few larger shell fragments, and much of the plant fibre. It is assumed that the shell fragments represent primarily gastropods. It would appear that the largest gastropod specimens were more susceptible to compression and weathering, leaving only the upper part of the spire complete.

The second sieve (850 µm) caught a large proportion of small bone fragments, many of the gastropods, fragmentary shell and, in the 100 ml samples, quite a few small, unreduced clay balls. The bone fragments consisted of both cortical and cancellous bone tissue. It is thought that this represents highly fractured bison material; only two specimens are definitely non-bison. The clay balls were discarded.

The third sieve (425 µm) segregated the coarser sand fraction, a high proportion of small bone fragments, many small gastropods, many larger ostracodes, some plant remains, and a great many shell fragments. The bone fragments consisted primarily of trabeculae fragments from disintegrating whole bone. As well, some tooth enamel fragments were observed. It is possible that a few of the bone fragments derive from small mammals or birds. The organic remains appear to consist of seeds, seed coats and unidentifiable material.

The finest screen (150 µm) caught primarily fine sand and a great many small ostracodes, as well as small bone spicules and some plant fragments, consisting mostly of seed and seed coat fragments. Insect remains were also noted in this fraction.

OBSERVATIONS

A number of observations were made concerning the recovered material. These are based on gross morphology and should be confirmed through detailed expert analysis.

Table 6. Weight of fine fractions for each subsample and percentage totals by sieve fraction.

Level/Quadrant	Fraction Retained by Sieve (U.S. Series)				
	6	20	40	100	TOTAL
22N NW	6.0	3.3	15.8	30.7	55.8
23N NE	3.9	3.5	12.7	36.5	56.6
23N NW	3.3	3.4	12.0	13.0*	31.7*
24N NE	9.1	2.5	11.8	32.4	55.8
24N NW	5.4	2.9	14.2	27.6	50.1
Total Weight (g)	27.5	15.6	66.5	140.2	250.0
% Total	11.0	6.2	26.6	56.1	100.0

* Sample was partly sorted when weighed, and this may have affected the smallest sample fraction.

All of the identifiable bone elements and fragments and most of the recognizable cortical bone were recovered from the two coarsest screens. The smaller sieves recovered primarily fragmented cancellous tissue or individual spicules, although the rarity of identifiable bone from rodents and other small species, together with the heaviness of the remains in the coarsest sieve, suggests that most of this material represents fragments of large mammal bone. Given that only bison was identified in the excavated sample, it is probable that the sieve sample represents the same species. The small number of identified specimens present would tend to confirm this. Much of the large bone was fractured in situ, apparently as the result of sediment loading upon water-logged specimens. The fine fraction likely derives from this source. The tooth enamel fragments cannot be identified further.

The amounts and sizes of bone present in this fraction vary widely between samples. Many fragments were identifiable as to general skeletal location (i.e., epiphysis, metaphysis or shaft). Possible skull fragments were found in six of the samples; tooth fragments were found in seven. Three whole teeth, an incisor and two lower premolars, all deciduous, were noted. Rib fragments were identifiable in three samples, and vertebral fragments were present in one. Elements of the foot were found in five of the samples. Bones from immature individuals, including some from foetal or neonatal animals, were present in eight samples.

Gastropod fragments were recovered from all screens. Whole specimens were least common in the coarsest sieve. Larger specimens were represented only as fragments. Species identification must await specialist analysis; however, it appears that four morphological varieties are present (described following Moore et al. 1952). These include (1) a dextral, conispiral form, (2) a planispiral or nearly planispiral form with very shallow umbilicus and round aperture, (3) a discoid, pseudoconispiral form with round aperture and deeper umbilicus, and (4) a pupaeform type with subdued surface features.

A number of forms of ostracodes were observed as well. These include (1) a kidney-shaped specimen with marked inner margin of the general form of *Candona* (Moore et al. 1952:522), (2) a kidney shaped specimen with one squarish end and inner margin, (3) a spherical form, lightly stippled with a small inner margin, (4) an oval form heavily stippled or bossed with small inner margin, generally present only as fragments, and (5) spherical, white specimens with no inner margin, which are rare. It is possible, since ostracodes moult, that some of these shapes may be related to developmental stages. The spherical forms tend to be smaller than the elongate forms. All but one form are transparent.

Ostracodes form the most common item by number in the finest fraction. An estimate was made of the numbers present. A 1 g sample of sediment from the finest sieve was measured and distributed evenly over the gridded sorting stage, and the number of ostracodes were counted. A total of 75 whole or half specimens was recorded. By extension, a 1 litre soil sample could contain some 15,000 to 16,000 specimens.

The organic fraction includes seeds and seed coats, pieces of leaves, and stems, silicate casts of roots, and insect exoskeleton fragments. Seeds and seed coats, found in numbers as high as 30 and more in a 1 litre sample, were present in nine of the samples. At least four species are represented; the majority appear to be of the sedge (*Cyperaccaeisa*) family.

A number of insect species are present in the form of isolated body segments. Beetles (*Coleoptera*) are the most common, and several species are represented. Also noted were a small fly and a mite-like specimen.

It must be pointed out that contamination by the addition of roots of successive plant communities and by their inadvertent inclusion during sample collection and processing is possible. However, close examination of specimens indicated the presence of a sugary mineral rime. A microscope of greater magnification than the model used in the present study would be needed to verify this observation.

The sand grains recovered from the two smallest sieve sizes included mostly round-grained clear quartz. Some small quartz crystal was present as well. Red, rose and orange were the most common colours observed. Green and purple-tinted specimens occur in lesser quantities. A small proportion of fine quartzite, limestone (?) and an unidentifiable black microcrystalline material occurred. Microdebitage was not noted in the examined samples.

CONCLUSIONS

The search for fine fraction materials within archaeological deposits has been undertaken occasionally in Alberta (e.g., Ball and Bobrowsky 1987). Such analyses have existed in archaeology since the mid-19th century; an Austrian scientist apparently used the technique to recover material from ancient Egyptian bricks in 1860 (Watson 1975:78). Flotation techniques were introduced into North America in the 1930s. Griffin (1967) emphasized the need to recover fine fractions for subsistence analysis; however, the most influential advocate of the technique has probably been Stuart Struever (1968). Struever's investigations of Hopewell sites in the Illinois River valley have especially benefitted from such research.

Many of the projects which have included a fine fraction component have processed bulk soil samples by flotation. This technique and the necessary apparatus are reviewed exhaustively by Watson (1975). In general, the technique involves submerging a screen in water, adding the bulk soil sample, and agitating. As the heavier material sinks to the bottom, the lighter, generally organic fraction is recovered by passing a hand screen through the water. Of course, this recovers only a sample of the fine fraction present. While the use of chemicals with a specific gravity greater than water and various agitating mechanisms and frothing agents have been employed to enhance recovery, the basic approach is little different than that described above. Although I experimented with the technique, most of the recovery was of plant material, a few insects and gastropods. The technique generally did not provide adequate recovery of heavier fractions. It might prove useful with Fletcher sediments if only the floral component is required.

The use of nested sieves and wet screening seems to be a superior technique, at least for the sediments from the Fletcher site. This allows processing of small samples, yielding size-graded specimens in large enough numbers to be more than adequate for statistical analysis. While all fine fraction recovery and analysis is extremely time-consuming, Ball and Bobrowsky (1987) cogently argue its effectiveness. Fine fraction analysis provides data for subsistence and palaeoenvironmental reconstruction which simply are not available from standard archaeological procedures.

The processing of samples from the Fletcher site has provided a sample of gastropods, ostracodes, insect parts and plant material useful for palaeoenvironmental reconstruction. Although sedimentary deposits suitable for standard palynological analyses and older than 3,000 years (Vickers 1986:110) have yet to be found on the Alberta plains, fine fraction analysis may prove to be most useful in reconstructing local microenvironments in the remote past. This study has demonstrated the efficacy of the technique and promises to provide a wealth of palaeoenvironmental data that will enhance our understanding of the Alberta/Cody use of the Fletcher site in the Early Prehistoric Period.

PRELIMINARY REPORT OF THE 1988 AND 1989 FIELD SEASONS AT HEAD-SMASHED-IN BUFFALO JUMP

By
Bob Dawe and Jack Brink
Archaeological Survey of Alberta

INTRODUCTION

Staff of the Archaeological Survey of Alberta returned to Head-Smashed-In during the summers of 1988 and 1989 to resume an ongoing program of research and mitigative archaeological studies. With the completion of a 3,000 square metre interpretive centre at Head-Smashed-In during the summer of 1987, archaeological investigations have been cast into the public eye, and more emphasis has been placed on public interpretation. To fulfill these needs, the excavations undertaken at Head-Smashed-In Buffalo Jump during the 1988 and 1989 seasons were an extension of the excavations in the camp/processing area initiated in 1987 (Brink and Dawe 1988). The primary research objective was to open a large, contiguous exposure in the heart of the camp/processing area in order to gain a better understanding of the spatial patterning of bison processing and to compile evidence of campsite activities in this deposit. These excavations occurred adjacent to a hiking trail which permitted public access, and the "dig pit" was visited by a continuous stream of interested spectators during the summer months.

Excavation proceeded to the north, east and west of the 8 sq. m area that was excavated in 1987. An additional 36 sq. m were opened, eventually covering a rectangular area measuring 4 x 11 m (Figure 37). The methodology was consistent with that used during the 1987 season. Excavation proceeded in 10 cm arbitrary levels, and all matrix was screened using 1/4 inch mesh. Lithic artifacts that measured more than 1 cm in any dimension were piece plotted, and smaller pieces were bagged by level and excavation unit. Fire-broken rocks that measured more than 5 cm in length and all identifiable bones were mapped by 10 cm levels and removed for analysis.

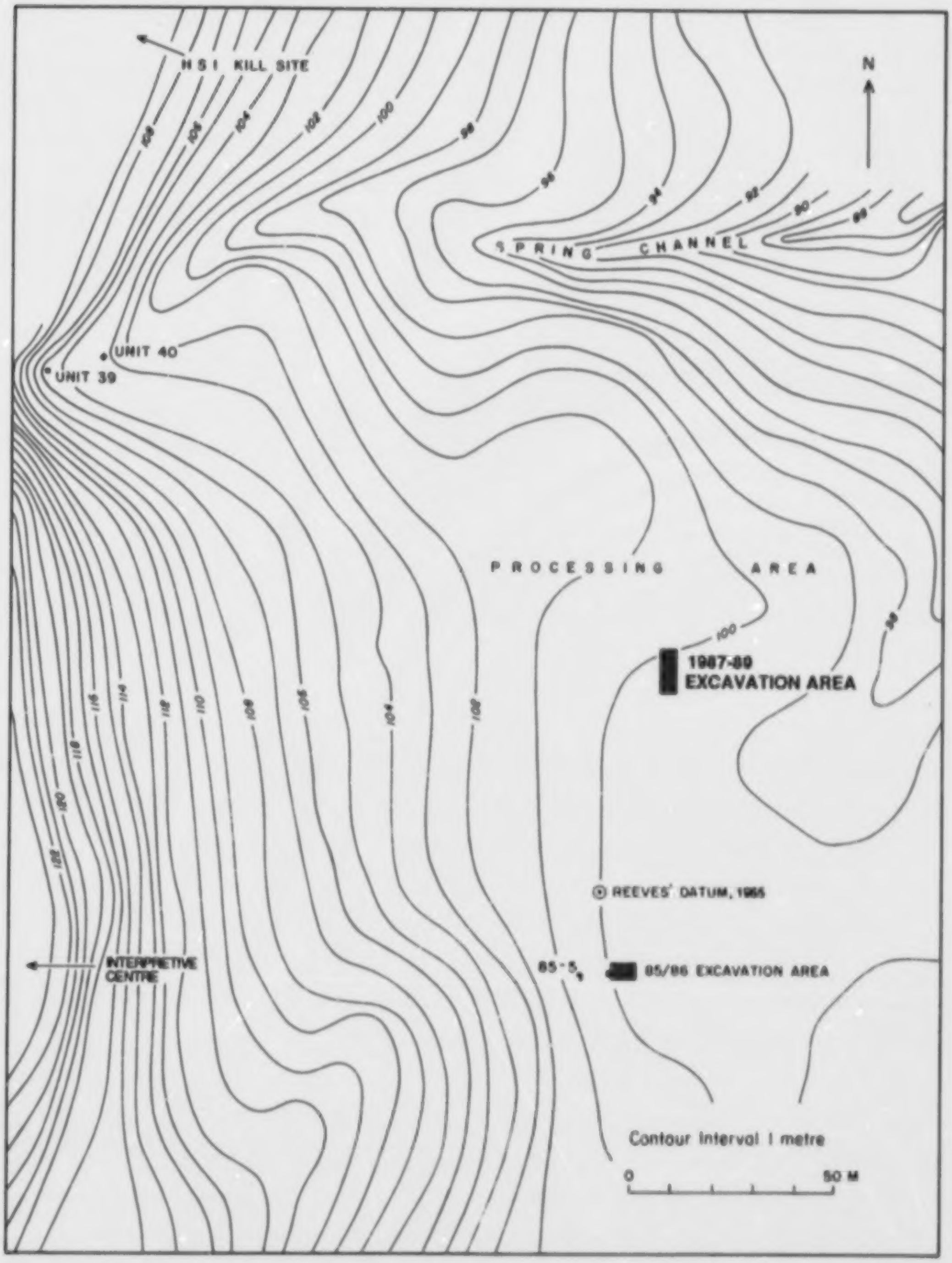

HSI KILL SITE
N
108
106
104
102
100
98
96
94
92
90
88
SPRING CHANNEL
UNIT 40
UNIT 39
PROCESSING AREA
100
98
1987-89
EXCAVATION AREA
122
120
118
116
114
112
110
108
106
104
102
REEVES' DATUM, 1965
INTERPRETIVE CENTRE
85-5
85/86 EXCAVATION AREA
Contour interval 1 metre
0
50 M

Figure 37. Contour map showing the location of the 1988/1989 excavation area.

RESULTS

Cultural material in the processing area at Head-Smashed-In forms a veritable pavement that extends for hundreds of metres along the broad, flat prairie level parallel to the kill site (Figure 38). In the area excavated during 1988 and 1989, the bulk of the cultural material occurred consistently within the top, 20 cm thick Ah horizon that caps an essentially sterile, buff-coloured loess. This pavement of debris is uniform except where interrupted by cultural features, notably subsurface boiling or roasting pits, that often dip well into otherwise sterile soil. No natural or cultural stratigraphy is apparent within the upper Ah horizon. It is clear from the occurrence of discrete ash lenses and the relative vertical distribution of the Avonlea and Old Women's projectile points, however, that some semblance of cultural stratigraphy remains intact.

The final results of our 1988 and 1989 excavations are still being tabulated; however, the density and distribution of cultural material appears to be consistent with results obtained in 1987. More than 60,000 pieces of cultural material were recovered during the 1988 and 1989 seasons. This was principally lithic debitage but also included almost 10,000 identified faunal elements and hundreds of stone tools, cores and highly fragmented pieces of pottery. Furthermore, including the 1987 results, approximately 2 metric tonnes of fire-broken rock and 27 cultural features have now been recovered from this single, contiguous excavation area.

LITHIC REMAINS

The cataloguing and analysis of the over 50,000 lithic artifacts has not been completed; hence, only general comments can be made at this time. The initial impression of the lithic assemblage is that it nearly duplicates the assemblages recovered previously in the processing area (Brink and Dawe 1989; Brink et al. 1985, 1986). The vast majority of the lithic assemblage, more than 90%, is small debitage representing an extremely heterogeneous assortment of lithic materials. Hundreds of broken or worn out stone tools and tool edge fragments reflect a multitude of extractive and maintenance tasks associated with the plethora of processing and campsite

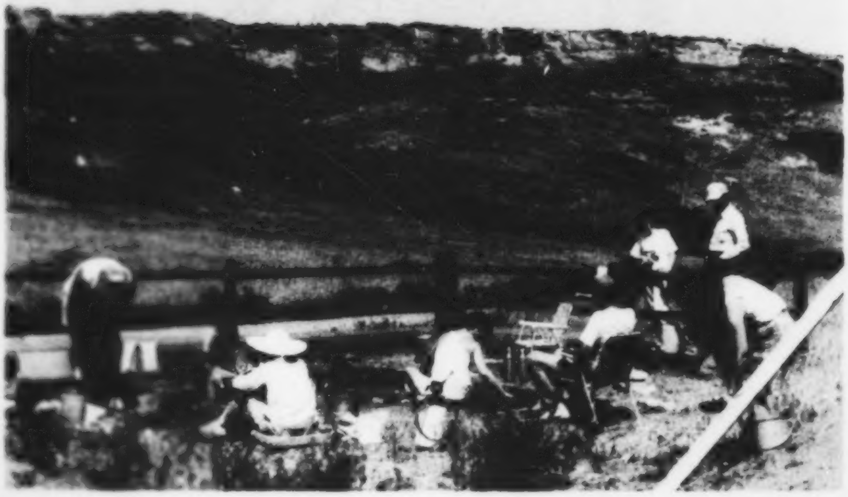


Figure 38. Photograph of the excavation in the camp/processing area looking northwest towards the kill site.

activities undertaken here. Arrowheads, small knives, endscrapers, sidescrapers, choppers and spokeshaves dominate the flaked stone tool assemblage, and numerous hammerstones, anvils and cobble pestles round out the bulk of the ground or unmodified stone tool category.

A dichotomy has been observed between the application of the coarse-textured stone of the local lithic suite and that of the non-local, fine-grained, siliceous materials. Coarse-grained materials, notably argillite and quartzite (which are abundant in the region), apparently were reduced on site and are represented by all stages of the reduction process. Typically, large, usually expedient butchering tools were made of these local materials. Fine-grained lithic materials, on the other hand, are rare in the vicinity of Head-Smashed-In and are usually represented by worn out or broken, small, formed tools or by the debitage associated with the final stages of lithic reduction or rejuvenation. Tens of thousands of tiny flakes of non-local raw materials, such as Swan River Chert, Madison Formation cherts, Knife River Flint, and Yellowstone obsidian, bear attributes which indicate that considerable maintenance of curated tools was undertaken here.

The users of Head-Smashed-In were very frugal with their lithic materials. Virtually every large piece of lithic material shows indications of use, often for several different functions. Bipolar reduction was utilized extensively, particularly in the reduction of pebble cherts and silicified wood. Hundreds of cores and shatter fragments derived from bipolar reduction attest to the need to recover useable pieces of fine-grained lithic material which would be unavailable otherwise. Even exhausted tools or thick flakes frequently were reduced further by this method.

Those lithic artifacts considered temporally diagnostic are related predominantly to Avonlea and Old Women's components; although, a few Besant and Pelican Lake points were recovered, as were a few as yet unclassified Middle Prehistoric dart points. One McKean dart point base, a type which has not been reported from the kill site previously (Reeves 1978, 1983c), was recovered. In fact, as excavation continues at Head-Smashed-In, the list of prehistoric components represented here is gradually being lengthened. We do not feel that these results indicate that significant components were overlooked in Reeves' excavations (Reeves 1978, 1983c) but merely that there were probably even more frequent, if ephemeral, visitations than were thought previously.

FIRE-BROKEN ROCK

A total of 10,699 pieces of fire-broken rock (FBR), weighing 1,623 kg, was recovered and analyzed during the 1988 and 1989 seasons. Only 15% of this (accounting for 17.5% of the total weight of FBR) is the sandstone which outcrops at the site. The remainder of these rocks apparently were transported several kilometres to the site for use in processing activities. The average density of FBR obtained from this area (45 kg per sq. m) was 3 kg higher than that recovered by the processing area excavations, undertaken in 1985 and 1986 approximately 100 m to the south (Brink and Dawe 1989). This slight increase in FBR density presumably reflects the closer proximity of the 1987-1989 excavation area to the kill site where a higher prevalence of cultural features which utilized stone as an aid in cooking or heating is expected. What is most impressive about the quantity and distribution of FBR is that it is consistently dense even in peripheral areas several hundreds of metres from the actual kill. This result attests to the considerable effort undertaken by the users of this site to wrest all potential resources from the enormous quantities of meat and fat which the jump availed.

FEATURES

In addition to the six cultural features already identified in this area in 1987 (Brink and Dawe 1988), 21 cultural features were excavated during 1988 and 1989. Two of these features were located during the final days of excavation in the 1989 season and were left largely intact to be completed in 1990. Apart from the resultant 2 sq. m area left unfinished, the area was excavated to sterile soil, normally at a depth of between 40 and 50 cm below surface.

Evidence of differential site use between the Late and Middle Prehistoric periods has been provided by the recovery of several intact cultural features in the block excavation initiated in 1987 and expanded in the two subsequent field seasons. Here, where cultural debris attests to countless episodes of cooking meat and preparing storable jerky or pemmican, features related to bison processing date consistently to the Late Prehistoric Period. A total of 12 hearths, six pit features, two bone uprights and one bone concentration rounds out the cultural features recovered during the 1988 and 1989 seasons.

Typically, the hearths are surface hearths that measure from 50 to 100 cm in diameter and are less than 10 cm deep. Usually, they consist of a concentration of clean, light grey ash and burned bone fragments or, rarely, charcoal. (Apparently, buffalo chips were used more commonly than wood as fire fuel.) Only one of these hearths (feature 89-10) was considered a prepared hearth in that it was encircled by a containment ring of rock. Of interest, this latter hearth did contain a high proportion of charcoal. Typically, the soil underlying these hearths is thermally altered leaving a distinctive reddish soil discoloration in an otherwise buff-coloured soil (Figure 39). In some cases, only the stain remains, and the actual hearth contents have long since dispersed or been removed by post-depositional site disturbance factors.

Two types of pit features were recorded. Five pits were regarded as probable boiling pits. These are usually less than a metre in diameter, with

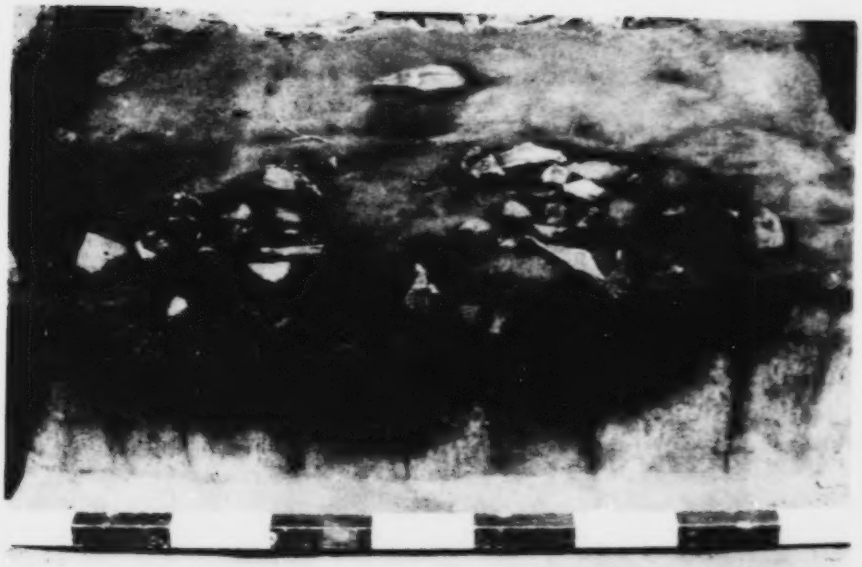


Figure 39. Profile view of hearth feature 89-6. The discoloration of the soil immediately below the hearth is due to thermal alteration.

the fill extending to a depth of 30 to 40 cm. Generally, the fill itself is composed of a mass of crushed limb bones interspersed with numerous pieces of FBR of varying sizes. The fire-broken rocks in the boiling pits predominantly are cobbles, usually quartzite, that were brought to the site specifically for the purpose of boiling water. These rocks typically are broken along irregular, crenelated fractures and otherwise are reticulated with cracks. This fracture pattern is a result of repeatedly quenching a red hot rock in water. The outline of the fill in these pits does not become evident until excavation has proceeded below the dense mat of similar materials that covers this area. Previous studies have indicated that much of the fill in the upper layers of these pits probably slumped into the pit from the adjacent area and is not in a primary context (Brink and Dawe 1989:46, 59; Brink et al. 1986:45, 70). Indeed, much of the surficial midden that blankets this area is similar to the boiling pit contents, suggesting that a considerable amount of this debris represents material that was either previously yarded out from boiling pits or perhaps dumped from temporary boiling basins made of hides staked above the ground. This practice of

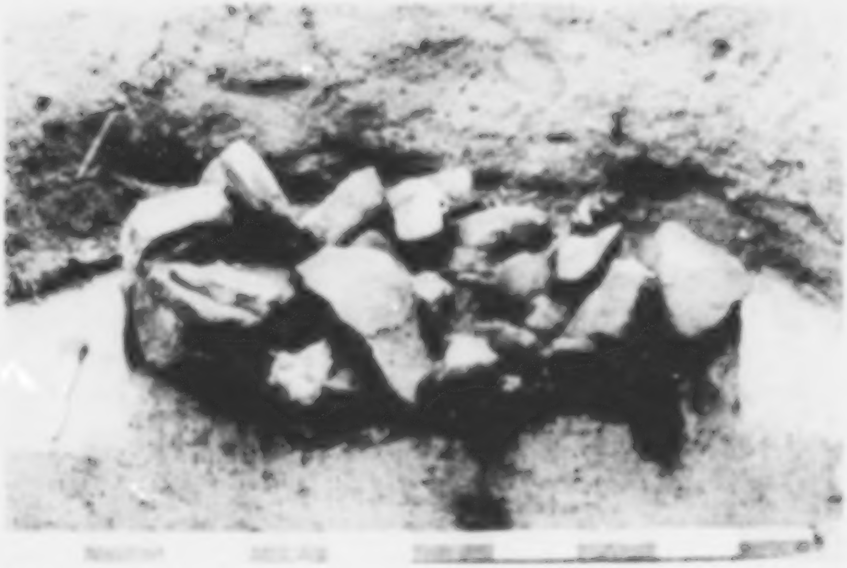


Figure 40. Profile of pit feature 88-9. A charcoal stain can be observed at the base of the rocks.

above-ground boiling has been documented by Hassrick (1964:189) and Wissler (1910:27).

One quite dissimilar pit (feature 88-9; Figure 40) has all the hallmarks of a roasting pit as described by Wissler (1910:25-26). The pit was approximately 1 m in diameter and 0.5 m deep. Most of the pit fill clearly was out of primary context, and it was only when excavation proceeded to the floor of the pit that the contents changed radically. The pit was floored with large sandstone slabs and quartzite cobbles. The latter were spalled due to differential expansion, and some spalls were still articulated, indicating that they had been heated in situ. Several large pieces of charcoal occurred in the rock lining, the likely remnants of a bed of coals over which we presume bison meat was buried and cooked.

In addition to the pit features described above, the remainder of a large pit feature exposed during the 1987 season (feature 87-4) was excavated. The bulk of the feature had been removed already, and we encountered nothing during its 1988 completion that changed our interpretation of this feature as a boiling pit. Most of the fill is interpreted as being debris dumped in the pit after its use, notably horn cores and vertebrae, and is not characteristic of the boiling pit function (Brink and Dawe 1988:14, 15). We did recover more cranial and post-cranial bison remains from this feature, and this will increase the 1987 result of an MNI of four individuals .

One bone upright feature was recovered in each of the 1988 and 1989 seasons. Each is composed of a cluster of a few long bones, oriented vertically, with articular ends uppermost where present. In both cases, a couple of small FBR fragments appear to be associated, perhaps to wedge the bone in the ground firmly. One of these uprights, feature 88-8, clearly has been stuck into a rodent burrow. No specific function could be determined for either of these features, but the possible function of similar upright features from the processing area has been discussed previously (Brink and Dawe 1989).

The function or origin of the bone concentration, feature 88-4, has not been determined. It consists of a dense cluster of bison limb bones covering an area roughly 90 x 60 cm.

FAUNA

Many thousands of *Bison bison* bones and hundreds of non-bison specimens were recovered during the 1988 and 1989 field seasons. Cataloguing the faunal remains has yet to be completed. It is apparent, however, that the basic nature of the faunal assemblage differs little from the assemblages recovered in 1985 and 1986 from excavations located some 100 m to the south. As such, the *Bison bison* faunal record is dominated by an abundance of the small, hard, dense elements of the lower limbs. Carpals, tarsals, phalanges and sesamoids are by far the most common individual elements. Various fragments of leg bones are also well represented, especially the distal tibia, proximal and distal radius, and both ends of the metapodials. Rare are all vertebral elements, all skull material except for the petrous bone, pelves except for the acetabulum, and certain leg bone portions, such as the distal femur and proximal humerus.

Fragmentation of fauna is such that catalogue classes with high NISP numbers include long bone fragments, vertebral fragments and rib fragments. Complete specimens of bones other than carpals, tarsals, phalanges and sesamoids are virtually nonexistent. As was noted in previous excavations in the processing area (Brink and Dawe 1989:84-85), bone recovered from within pit features tended to be in a better state of preservation than the surrounding bone scatter.

The extreme fragmentation of the HSI fauna is presumed to be a combination of two primary forces: the cultural modification of the bone for the recovery of bone marrow and grease and the natural deterioration of the bone as a result of severe weathering. The extremely slow deposition of soil at HSI no doubt resulted in prolonged exposure of most of the fauna (pit fill material being the exception), thus producing the characteristic desiccation and splitting of the bone surfaces. Many forms of butchering analysis will be precluded or limited due to the poor condition of the bone. Analysis likely will continue to focus on differential element representation in the processing area, on differing sex ratios and implications for herd composition, on the analysis of the economic utility of different elements, and on site taphonomy.

SUMMARY

Interpretations of the archaeological record in the processing area have been hampered by a lack of clear stratigraphy in this compressed deposit, which has limited our contributions to the culture history of the site. The culture-historical schema documented by Reeves (1978, 1983c), based on kill site excavations two decades ago, still provide the basis of the outline of the prehistoric use of Head-Smashed-In; however, excavations undertaken by the Archaeological Survey of Alberta indicate that the record of use of the processing area is not in complete accordance with the records obtained from the kill area. That is, the vast majority of cultural material excavated in the processing area during the 1988 and 1989 seasons is attributable to the Old Women's and Avonlea phases of the Late Prehistoric Period. Unlike the kill site, only a very sparse representation of earlier materials occurs in the processing area. The Besant and Pelican Lake components, which are well represented in the kill site, are rare in the processing area. This observation is consistent with results obtained by five previous years of testing in the camp/processing area by the Archaeological Survey of Alberta (Brink and Dawe 1989:31).

The notable lack of Middle Prehistoric materials in the processing area relative to those found in the kill site remains something of an enigma. Excavations by Reeves in the kill site deposits yielded evidence of considerable use of the kill in the Middle Prehistoric Period, commencing with a 5,600 year old Mummy Cave component (Reeves 1978, 1983c). Our excavations in 1988 did yield the base of a McKean projectile point and the earliest radiocarbon date yet obtained on cultural material recovered in our processing area excavations. This date, 5,120 ± 100 years BP (AECV 843C), was obtained on butchered bone from a depth of about 50 cm below the surface. The recovery of these Middle Prehistoric materials in the processing area is aberrant, however; it has become clear, as our sample size has increased, that evidence of an intensive use of this area before Late Prehistoric times is simply not forthcoming. The results of the 1988 and 1989 excavations reinforced our belief that the intensive post-kill processing of bison at Head-Smashed-In is an activity primarily, if not exclusively, restricted to the Late Prehistoric Period.

The 1989 season also signalled the beginning of new excavations in the stratified kill site deposits at Head-Smashed-In. A three year project directed by Brian Kooyman of the University of Calgary is slated to begin in earnest in 1990. The excavation was initiated in 1989 in the north kill site adjacent to an area previously examined by Reeves (1978, 1983c). A primary focus of this research is to examine the Mummy Cave component that Reeves encountered at a depth of 3-4 m in this area. These excavations will also provide an opportunity to compare the kill and processing assemblages in some detail and hopefully will shed some light on the why these two areas have such disparate records of use.

DINOSAUR PROVINCIAL PARK: THE FILIPOWSKI/VIPOND SURVEYS

By

J. Rod Vickers and David R. Case
Archaeological Survey of Alberta

INTRODUCTION

Although it is a World Heritage Site famous for its vertebrate fossil remains, Dinosaur Provincial Park has been but little examined for archaeological resources. Recently, however, as a result of management concerns, it was necessary to summarize the known archaeological data for the area and to make some estimate of site potential. In addition, the sites and our estimates of site discovery potential were plotted on 1:30,000 topographic maps provided by Alberta Recreation and Parks; this area forms the "Study Area" discussed here (Figure 41).

In the course of this exercise, the Archaeological Survey of Alberta became aware of surface surveys undertaken by Alberta Recreation and Parks summer staff. Robert Enns, lately of that department, kindly assembled and annotated their data for us. We organized the data into Borden-designated sites and have taken the opportunity to summarize them here (Table 7). It must be emphasized that these data are incomplete in that systematic survey of all the lands has not been done. However, the known site distribution is adequate to confirm estimates of site potential based on Adams' (1976) analysis of the lower Red Deer River.

PREVIOUS RESEARCH

Sporadic site recording in the Dinosaur Provincial Park area began with the Glenbow Foundation archaeological program of the late 1950s. Only two sites were recorded at that time. Ross Thomson, an archaeologist employed by Alberta Recreation and Parks, undertook two brief surveys in the early 1970s (Thomson 1973, 1974). These resulted in the recording of 20 sites, mainly on prairie level near the park entrance. Most of the remaining work by professional archaeologists has been conducted under

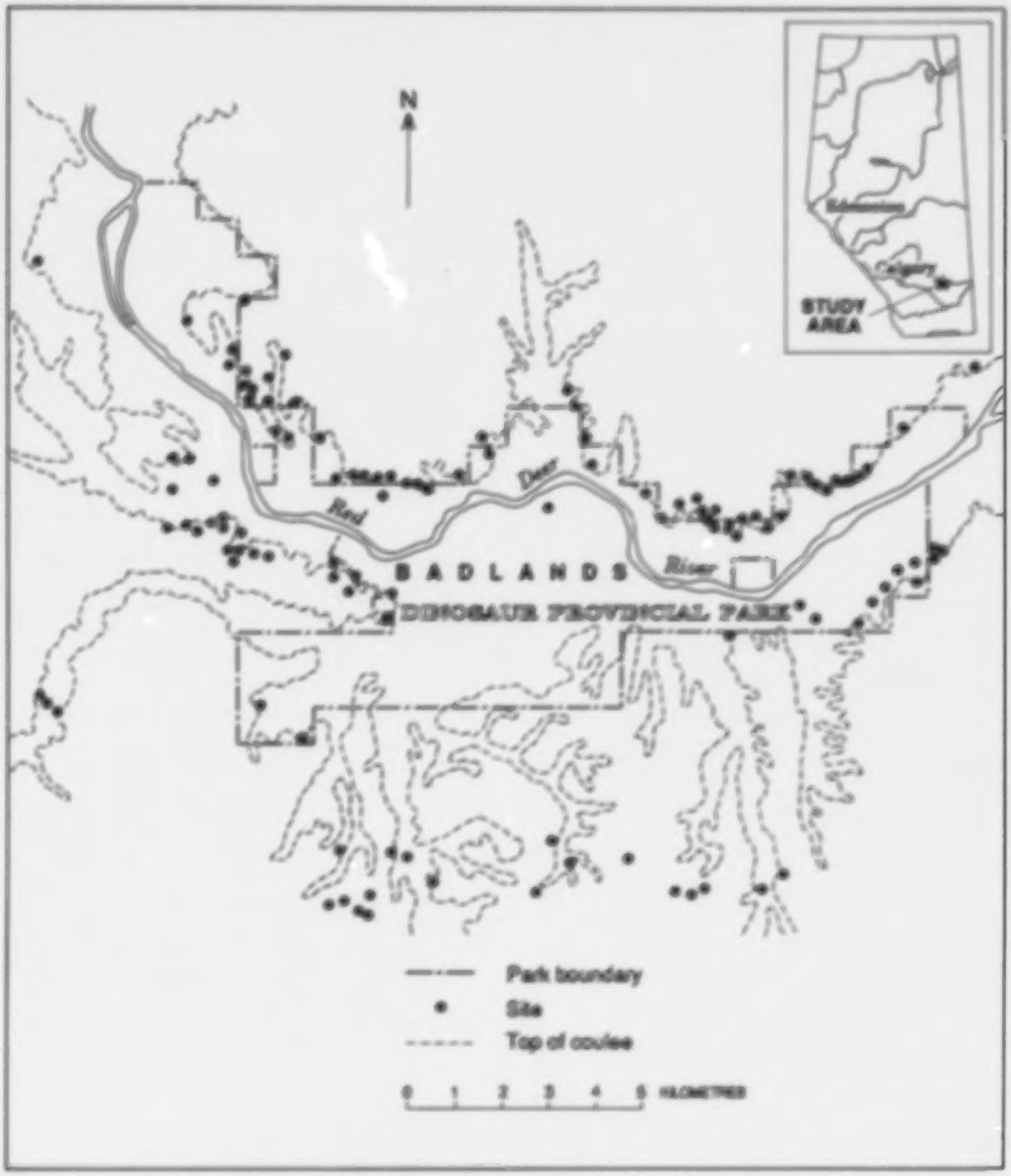

N
Edmonton
Calgary
STUDY AREA
Red
Deer
River
BADLANDS
DINOSAUR PROVINCIAL PARK
Park boundary
Site
Top of coulee
0 1 2 3 4 5 KILOMETRES

Figure 41. Map of Dinosaur Provincial Park.

Table 7. Sites in Dinosaur Provincial Park and environs.

Site	Field #	Type	Wheel/ Effigy/etc.	Ring	Arc	Cairn	Hearth	Researcher	Permit
EeOu-1	-	Vision quest	1	-	-	-	-	Thomson	74-26
EeOu-2	-	Stone feature	1	-	-	-	-	Forbis/King	non-permit
EeOu-3	-	Cabin	-	-	-	-	-	Thomson	74-26
EeOu-4	-	Ranch	-	-	-	-	-	Thomson	74-26
EeOu-5	-	Stone circle	-	2	3	-	-	Wright/Apland	78-76/80-139
EeOu-6	-	Stone circle	-	-	1	-	-	Wright	78-76
EeOu-7	-	Surface scatter	-	-	-	-	-	Wright	78-76
EeOu-8	-	Surface scatter	-	-	-	-	-	Wright	78-76
EeOu-9	-	Surface scatter	-	-	-	-	-	Wright	78-76
EeOu-10	-	Surface scatter	-	-	-	-	-	Wright	78-76
EeOu-11	-	Stone circle	-	4	-	-	-	Brumley	79-3
EeOu-12	-	Stone circle	-	9	-	7	-	Brumley	79-3
EeOu-13	-	Cairn	-	-	-	1	-	McCullough	81-188
EeOu-14	-	Surface scatter	-	-	-	-	-	McCullough	81-188
EeOu-15	-	Isolated find	-	-	-	-	-	McCullough	81-188
EeOu-19	-	Stone circle	-	14	-	-	-	Reeves	82-159
EeOu-21	p23	Stone circle	-	3	2	1	-	Filipowski	non-permit
EeOu-23	p24	Stone circle	-	31	7	1	-	Filipowski	non-permit
EeOu-24	p25	Stone circle	-	3	-	-	-	Filipowski	non-permit
EeOu-25	p26	Stone circle	-	11	3	-	-	Filipowski	non-permit
EeOu-26	p27	Stone circle	-	2	-	-	-	Filipowski	non-permit
EeOu-27	p28	Stone feature	1	28	3	2	-	Filipowski	non-permit
EeOu-28	p29	Stone circle	-	2	-	-	-	Filipowski	non-permit
EeOu-29	p30	Stone feature	1	5	4	-	-	Filipowski	non-permit
EeOu-30	p31	Stone circle	-	4	-	-	-	Filipowski	non-permit
EeOu-31	p32	Stone circle	-	2	-	-	-	Filipowski	non-permit
EeOu-32	p33	Stone circle	-	1	1	-	-	Filipowski	non-permit
EeOu-33	p34	Stone circle	-	5	1	-	-	Filipowski	non-permit

Table 7. continued

Site	Field #	Type	Wheel/ Effigy/etc.	Ring	Arc	Cairn	Hearth	Researcher	Permit
EeOu-34	p35	Stone circle	-	8	3	1	-	Filipowski	non-permit
EeOu-35	p36	Stone circle	-	8	5	-	-	Filipowski	non-permit
EeOu-36	p37	Stone circle	-	-	4	3	-	Filipowski	non-permit
EeOu-36	-	Stone circle	-	2	-	-	-	Filipowski	non-permit
EeOu-37	p38	Stone circle	-	18	20	-	-	Filipowski	non-permit
EeOu-38	p39	Stone circle	-	7	-	-	-	Filipowski	non-permit
EeOu-39	p40	Stone circle	-	9		-	-	Filipowski	non-permit
EeOu-40	p41	Stone circle	-	2	-	-	-	Filipowski	non-permit
EeOu-41	p42	Stone feature	1	1	-	-	-	Filipowski	non-permit
EeOu-42	p43	Stone circle	-	4	1	1	-	Filipowski	non-permit
EeOu-43	p44	Stone circle	-	2	-	1	-	Filipowski	non-permit
EeOu-44	p45	Stone circle	-	11	1	1	-	Filipowski	non-permit
EeOu-45	p46	Stone circle	-	4	3	-	-	Filipowski	non-permit
EeOu-46	p47	Stone circle	-	5	1	1	-	Filipowski	non-permit
EeOu-47	p48	Stone circle	-	14	2	-	-	Filipowski	non-permit
EeOu-48	p49	Stone circle	-	22	3	7	-	Filipowski	non-permit
EeOu-50	p54	Stone feature	1	2	3	2	-	Vipond	non-permit
EeOu-51	p55	Stone circle	-	9	2	3	-	Vipond	non-permit
EeOu-52	p53	Stone circle	-	1	1	1	-	Vipond	non-permit
EeOu-52	p56	Stone circle	-	1	-	1	-	Vipond	non-permit
EeOu-53	p57	Stone feature	1	4	2	2	-	Vipond	non-permit
EeOu-54	p58	Stone circle	-	3	-	-	-	Vipond	non-permit
EeOu-55	p59	Stone feature	1	-	1	-	-	Vipond	non-permit
EeOu-56	p60	Stone circle	-	-	1	1	-	Vipond	non-permit
EeOu-57	p52	Stone feature	2	?	-	-	1	Vipond	non-permit
EeOu-60	p61	Stone circle	-	14	5	3	-	Vipond	non-permit
EeOu-62	p22	Stone circle	-	2	1	-	-	Filipowski	non-permit
EeOu-63	p50	Stone circle	-	4	1	1	2	Vipond	non-permit

Table 7. continued

Site	Field #	Type	Wheel/ Effigy/etc.	Ring	Arc	Cairn	Hearth	Researcher	Permit
EeOu-64	p51	Stone circle	-	1	1	-	-	Vipond	non-permit
EeOv-1	-	Stone feature	1	-	-	-	-	Forbis	non-permit
EeOv-2	-	Surface scatter	-	-	-	-	-	Reeves	non-permit
EeOv-4	-	Stone circle	-	1	-	1	-	Thomson	74-26
EeOv-5	-	Stone circle	-	1	-	-	-	Thomson	74-26
EeOv-6	-	Stone circle	-	1	-	-	-	Thomson	74-26
EeOv-7	-	Stone circle	-	1	-	-	-	Thomson	74-26
EeOv-8	-	Stone circle	-	1	-	-	-	Thomson	74-26
EeOv-9	-	Stone circle	-	1	-	-	-	Thomson	74-26
EeOv-10	-	Stone circle	-	1	1	-	-	Thomson	74-26
EeOv-11	-	Chipping station	-	-	-	-	-	Thomson	74-26
EeOv-12	-	Stone circle	-	7	-	1	-	Thomson	74-26
EeOv-13	-	Surface scatter	-	-	-	-	1	Thomson	74-26
EeOv-14	-	Stone circle	-	6	-	-	-	Thomson	74-26
EeOv-15	-	Stone circle	-	2	-	-	-	Thomson	74-26
EeOv-16	-	Chipping station	-	-	-	-	-	Thomson	74-26
EeOv-17	-	Stone circle	-	4	-	-	-	Thomson	74-26
EeOv-18	-	Buried camp	-	-	-	-	1	Thomson	74-26
EeOv-19	-	Stone circle	-	1	-	-	-	Thomson	74-26
EeOv-20	p66	Stone circle	-	2	-	-	-	Thomson/Filipowski	74-26
EeOv-21	p63	Stone circle	-	4	-	-	-	Quigg/Filipowski	74-26
EeOv-22	-	Buried camp	-	-	-	-	1	Wright	78-76
EeOv-23	-	Buried camp	-	-	-	-	-	Wright	78-76
EeOv-24	-	Surface scatter	-	-	-	-	1	Wright	78-76
EeOv-25	-	Surface scatter	-	-	-	-	-	Wright	78-76
EeOv-26	-	Surface scatter	-	-	-	-	-	Wright/Apland	78-76/80-35
EeOv-27	-	Surface scatter	-	-	-	-	-	Wright	78-76
EeOv-28	-	Surface scatter	-	-	-	-	-	Wright	78-76

Table 7. continued

Site	Field #	Type	Wheel/ Effigy/etc.	Ring	Arc	Cairn	Hearth	Researcher	Permit
EeOv-31	-	Isolated find	-	-	-	-	-	Wright	81-12
EeOv-32	-	Surface scatter	-	-	-	-	-	Wright	81-12
EeOv-33	-	Isolated find	-	-	-	-	-	McCullough	81-188
EeOv-34	-	Surface scatter	-	-	-	-	1	McCullough	81-188
EeOv-35	-	Isolated find	-	-	-	-	-	McCullough	81-188
EeOv-36	-	Stone circle	-	2	-	-	-	Heitzmann & Wilson	82-67
EeOv-41	p2	Stone feature	1	2	2	-	-	Filipowski	non-permit
EeOv-42	p3	Stone circle	-	1	-	-	-	Filipowski	non-permit
EeOv-43	p4	Stone circle	-	1	-	-	-	Filipowski	non-permit
EeOv-44	p1	Stone feature	2	5	2	1	1	Filipowski	non-permit
EeOv-45	p5	Stone circle	-	5	-	-	-	Filipowski	non-permit
EeOv-46	p6	Stone circle	-	7	-	-	-	Filipowski	non-permit
EeOv-47	p7	Stone circle	-	15	-	-	-	Filipowski	non-permit
EeOv-48	p8	Stone circle	-	14	5	-	-	Filipowski	non-permit
EeOv-49	p9	Stone circle	1	5	3	-	-	Filipowski	non-permit
EeOv-50	p10	Stone circle	-	5	2	1	-	Filipowski	non-permit
EeOv-51	p11	Stone circle	-	2	-	-	-	Filipowski	non-permit
EeOv-52	p12	Stone feature	1	1	-	-	-	Filipowski	non-permit
EeOv-53	p13	Stone circle	-	2	1	-	-	Filipowski	non-permit
EeOv-54	p14	Stone circle	-	6	2	-	-	Filipowski	non-permit
EeOv-55	p15	Stone circle	-	3	11	-	-	Filipowski	non-permit
EeOv-56	p16	Stone circle	-	3	-	1	-	Filipowski	non-permit
EeOv-57	p17	Stone circle	-	2	-	-	-	Filipowski	non-permit
EeOv-58	p18	Stone circle	-	7	-	-	-	Filipowski	non-permit
EeOv-59	p19	Stone circle	-	3	3	-	-	Filipowski	non-permit
EeOv-60	p20	Stone feature	1	-	-	1	-	Filipowski	non-permit
EeOv-61	p21	Stone circle	-	5	2	2	-	Filipowski	non-permit
EeOv-62	p62	Stone circle	-	2	2	1	-	Filipowski	non-permit
EeOv-65	p64	Stone circle	-	2	-	-	-	Filipowski	non-permit
EeOv-66	p65	Stone circle	-	1	-	-	-	Filipowski	non-permit

the requirements of the Historical Resources Act. This work has involved primarily impact assessments in conjunction with gas pipelines and transmission lines. Most of the impact assessments have been conducted south and west of the park. These investigations resulted in the recording of an additional 27 sites in the study area (Apland and Wright 1980; Brumley 1980; Heitzmann and Wilson 1982; McCullough et al. 1982; Reeves 1983b; Wright 1979, 1981).

By far, most of the archaeological survey within the park has been conducted by temporary summer employees of Alberta Recreation and Parks (Filipowski 1984; Vipond 1989). Maria Filipowski recorded archaeological features along all of the north prairie margin of the valley in 1984. Portions of the south prairie margin also were surveyed by Filipowski; she recorded 53 new sites, as well as two sites (EeOv-21 and 21) that had been recorded previously by other researchers. Joseph Vipond recorded a further 12 sites along the southern zone in 1989. Thus, fully 57% of the database for the study area resulted from the initiative of Alberta Recreation and Parks staff.

METHODOLOGY AND DATA MANIPULATION

Parks staff first divided the uplands adjacent to the river valley into arbitrary survey sectors for convenience. Both Parks investigators then conducted vehicle traverses:

> The survey was done by driving along the edge of the prairie approximately ten feet from the edge. Any visible glacial erratics [cobbles] were closely examined for adjacent erratics, and any patterns noted. Any features were checked carefully on foot (Vipond 1989:1).

Features were sketched on enlarged maps. Filipowski's maps, derived from 1:10,000 air photos, show only the features, trails and escarpment edges. Vipond employed 1:10,000 maps which contain contours and other topographic information. Both investigators drew actual features – circles, arcs and cairns – on the base maps. Filipowski sketched features of special interest, such as effigies and alignments, in greater detail at an enlarged scale; sketches derived from some of these are included here (Figure 42).

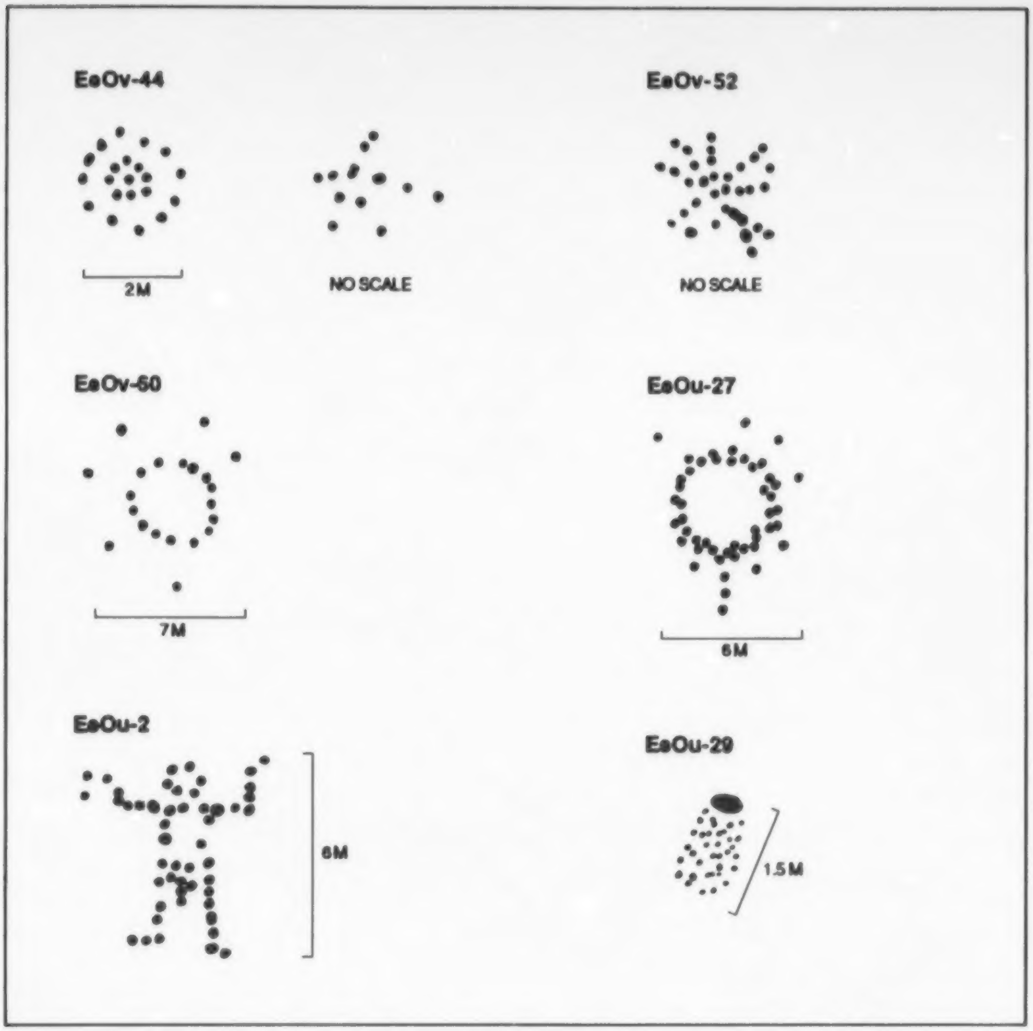

EaOv-44
2M
NO SCALE
EaOv-52
NO SCALE
EaOv-60
7M
EaOu-27
6M
EaOu-2
6M
EaOu-29
1.5M

Figure 42. Selected complex stone features (from Filipowski 1984).

In contrast, Vipond actually mapped such features onto grid paper. The investigators estimated stone circle diameters in 1 m increments and recorded feature definition in a three-rank visibility index. Both Filipowski and Vipond wrote reports summarizing the results of their studies (Filipowski 1984; Vipond 1989).

For our project, it was necessary to reorganize the Filipowski and Vipond data. Since both had recorded individual features, the features were first grouped into defined sites. The approach was simply to group features that occurred in proximity to each other. Because we had to work with the data before site forms were submitted, a sequential number (prefaced by a "p") was assigned to each site as a temporary measure. All sites have now been given Borden Numbers, and site forms have been completed. In general, Adams' (1976:90) approach to site definition has been followed, as far as the data allow.

Filipowski (1984) and Vipond (1989) provided summary tables listing the number of features, feature size and visibility for their study sectors. These data do not agree with the map illustrations and obviously include additional features. Since we counted site features directly from the maps in formulating our site definitions, it seemed best to ignore their summary tables. It appears that the main discrepancy is with the number of arcs, cairns and hearths; perhaps these were not illustrated as consistently on the maps as were the complete circles. In any case, most professional archaeologists discover unrecorded stone features at their own sites when revisiting, so the problem is a common one for all.

THE DATA

Some 114 archaeological and historical sites have been recorded in the study area (Figures 41 and 43; Tables 7 and 8). The most common site type, accounting for almost 65% of the sample total, is the stone circle site (n=74). Complex stone feature sites (n=13, 11.4%) also often include stone circles, along with the effigies and other rock alignments by which these sites are defined. Surface scatters (n=14, 12.3%) were fairly common but were recorded primarily by professionals conducting impact assessments outside of the park boundaries. All other site types occur in low frequency.

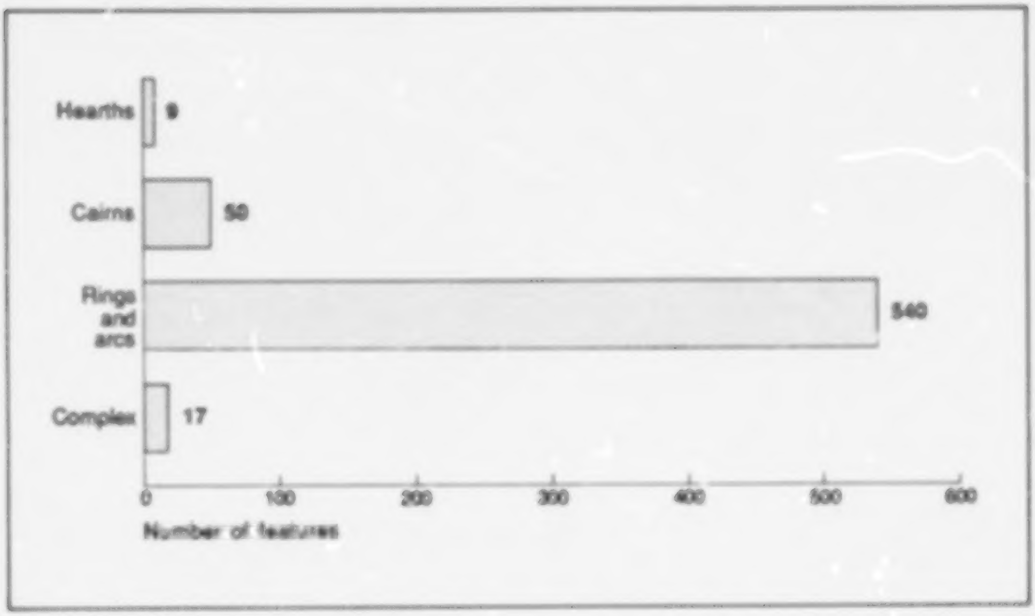


Figure 43. Feature frequencies in Dinosaur Provincial Park.

At least 540 tipi rings and arcs have been recorded at the stone circle and stone feature sites (Figure 44; Table 9). The number of rings at particular sites ranges from one to 38, although it is likely that the larger ring sites represent multiple occupation accumulations (see Vickers

Table 8. Site type frequencies in Dinosaur Provincial Park study area.

Site Type	N	%
Total number of stone feature sites	13	11
Total number of stone circle sites	74	65
Total number of vision quest sites	1	1
Total number of historical sites	2	2
Total number of surface scatter sites	14	12
Total number of cairn sites	1	1
Total number of isolated find sites	4	4
Total number of chipping station sites	2	2
Total number of buried campsites	3	3
Total	114	100

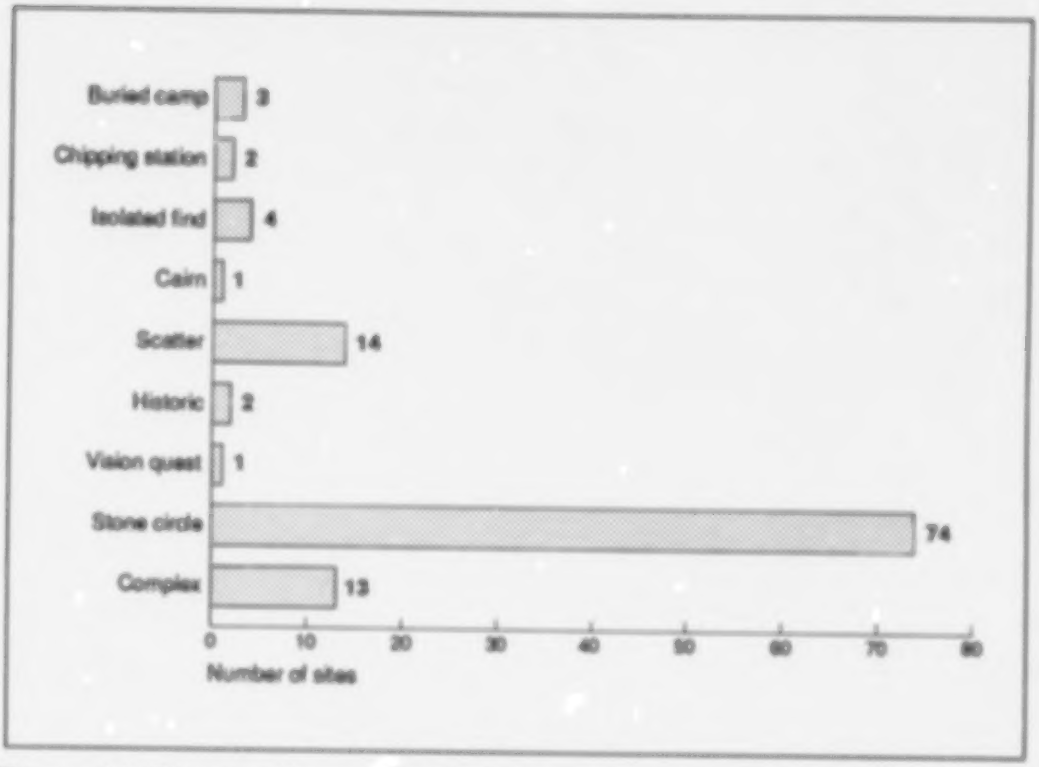


Figure 44. Site type frequencies in Dinosaur Provincial Park.

1989:88). The majority of these sites are situated along the north valley escarpment edge. Filipowski indicates that, commonly, tipi rings are most visible near the escarpment edge, and features are more obscure, in uneroded topography back from the break-in-slope. One should note that

Table 9. Feature frequencies in Dinosaur Provincial Park study area.

Features	N	%
Total number of complex stone features (ceremonial structures?)	17	3
Total number of tipi rings and arcs	540	88
Total number of cairns	50	8
Total number of hearths	9	1
Total	616	100

survey of the south escarpment is incomplete, but a few stone circle sites have been found on knolls and mesas within the badland topographic zone.

A total of 13 complex stone features has been recorded in the area. These features include effigies, possible medicine wheels and other stone structures of an apparent non-domestic nature. A sample of selected sketches is presented in Figure 42. Most of these complex structures need to be mapped in the field to confirm their morphology. Their distribution parallels that of the stone circle sites; indeed, most of the stone feature sites also include stone circles.

Surface scatters constitute the second largest category of Dinosaur Provincial Park sites (n=14). Most of these have been recorded south of the park along the margins of tributary coulees. These sites commonly were identified in blowouts and still may contain buried, intact deposits away from the erosional zones. All were recorded by professional archaeologists.

All other site types occur in low frequencies (Table 9; Figure 43). These include a single vision quest site, one cairn site, two historical sites (a cabin and the Old Mexico ranche), two chipping stations, three buried camps and four isolated finds. Notably absent are major winter campsites and bison kill sites.

DISCUSSION

Comparison of the Dinosaur Provincial Park data with the Brumley and Dau (1988) data from southeastern Alberta in general, and Forty Mile Coulee in particular, indicates strong parallels in site feature frequency (Figure 45). Small sites, containing one to five stone circles, dominate the samples; the southeastern Alberta (67%) and Dinosaur Park (71%) sets are strikingly similar. The somewhat higher frequency of such sites at Forty Mile Coulee (77%) may reflect local environmental exploitation differences or, more likely, simply may reflect a normal range of variation. In any case, the similarities in the sample profiles strongly suggest that the Filipowski and Vipond data are accurate and that their surveys were well executed, indeed.

The current database indicates that the high density of archaeological sites noted by Adams (1976) along the lower Red Deer River continues through the Dinosaur Provincial Park reach of the valley. Adams

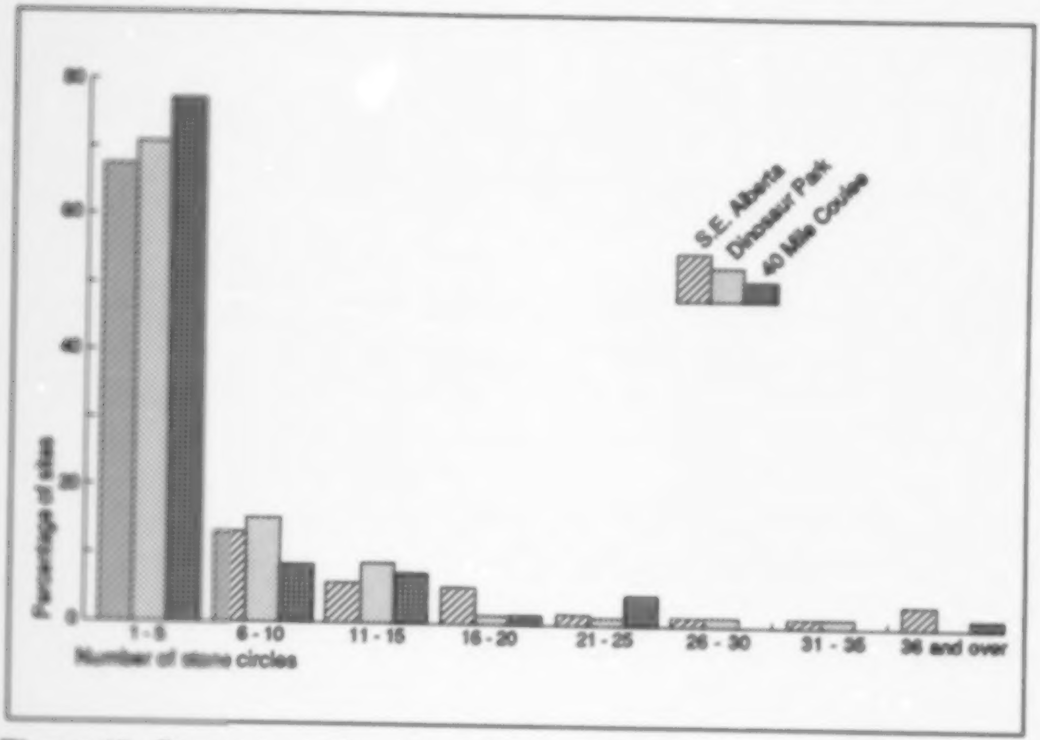


Figure 45. Comparison of number of stone circles per site.

(1976:108) argues that it was access to diverse microhabitats which likely governed Native selection of such escarpment locales. Such positioning allowed exploitation of both the river valley and adjacent uplands.

Brumley and Dau (1985, 1988) note a similar situation along the South Saskatchewan River valley on the Suffield Military Reserve. The primary predictor of site density in that region is distance from the river. The average density of archaeological sites on the whole military reserve is about 4.9 sites per square mile; however, the zone from 0 to 1 mile from the valley rim produced site densities of about 22 sites per square mile (Brumley and Dau 1985:165; see also Vickers 1989:87).

Both the Red Deer and South Saskatchewan data compare well with site distributions on the Oldman and Milk drainages (see Reeves 1987; Van Dyke and Head 1987). These data indicate that a pattern of river valley escarpment selection for spring-summer-fall sites existed in the native settlement system. It is apparent that access to water, especially in the summer and early fall, was a prime determinant of settlement decisions.

Of course, such locales were well situated to intercept the bison as they passed between watering areas on the rivers and their pastures out on the plains. As has been suggested many times, the prairie escarpments had the added advantage of winds to discourage mosquitoes and other insect pests.

The other portion of the park, the in-valley badlands and river terraces, are poorly known archaeologically. River terraces can contain magnificent archaeological sites; major winter campsites with artifact/faunal densities of 1,000 items per square metre occur sporadically in such situations (Vickers 1989). Shelter, water and firewood were critical items needed to support the lengthy occupation of such winter habitation locales. While Adams (1976:93) found few sites within the floodplain and terrace system downstream from Dinosaur Provincial Park, this is almost certainly a function of his survey strategy and the lack of adequate subsurface exposures. Exploration of other river valleys suggests a greater potential for sites on such landforms than does Adams' work. Indeed, Brumley and Dau (1988:90) note, " The valley system contains the largest number and greatest diversity of archaeological features present anywhere within southeastern Alberta." However, so little data are available for either the terrace locales in Dinosaur Provincial Park, or for badland topographic zones generally, that we are unable to tender an accurate estimate of site potential for that zone of the park.

CONCLUSIONS

The known archaeological database for Dinosaur Provincial Park, comparative data from other plains river valleys, and models of native land use indicate that the lands in and adjacent to the park have a high density of archaeological sites. Settlement along the north side of the Red Deer River valley within the park (recorded by Filipowski) is similar to that noted along other river valleys in Alberta. Initial data, obtained from Vipond's survey along the eastern part of the south side, suggest that the presence of badland topography between the escarpment edge and the river itself exerted little influence on this settlement pattern. However, this should be investigated further through the completion of the south side survey.

The sites in Dinosaur Provincial Park include very rare petroforms, such as effigies, as well as the more common tipi rings. Although not quantified, one's impression from both the Filipowski/Vipond data and Adam's work is that unusual stone features – effigies and odd rock alignments – are more frequent on the lower Red Deer River than on the other major drainage systems. A perusal of Brumley's (1988a:4) distribution map of medicine wheels also suggests a greater concentration of these features on the lower reaches of the Red Deer. This observation will need to be confirmed by further research, and an explanation must be sought.

EdOm-13: ARCHITECTURAL VARIABILITY IN PREHISTORIC STONE CIRCLES NEAR EMPRESS, ALBERTA

By
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INTRODUCTION

EdOm-13 is a small stone circle site located 80 km northeast of Medicine Hat and 33 km south of Empress, near the Alberta-Saskatchewan border (Figure 46). During reconnaissance of the proposed site of Alberta Power's McNeill DC Converter Station, personnel of the Public Lands Division of Alberta Forestry, Lands and Wildlife reported the presence of possible stone circles within the proposed station location (Figure 47). Fedirchuk, McCullough & Associates Ltd. (FMA) of Calgary was contracted by Alberta Power to verify the presence of these features and to recommend appropriate action. On-site investigation by FMA archaeologists confirmed the presence of eight surface stone circles within the proposed station boundaries, and they recommended detailed feature mapping to mitigate anticipated construction and post-construction impacts. The Archaeological Survey of Alberta concurred with these recommendations, and the site was mapped by FMA archaeologists in May, 1988. This report is a summary of the methods and results of this mapping project.

STONE CIRCLE STUDIES

Stone circle studies have progressed considerably since the early years of research on the northern plains when tipi rings often were considered unproductive and unworthy of study (Davis 1983). Numerous exemplary monographs that recognize and exploit some of the potential of architectural analysis can now be cited. These studies have demonstrated an ever-increasing sophistication in the application of quantitative

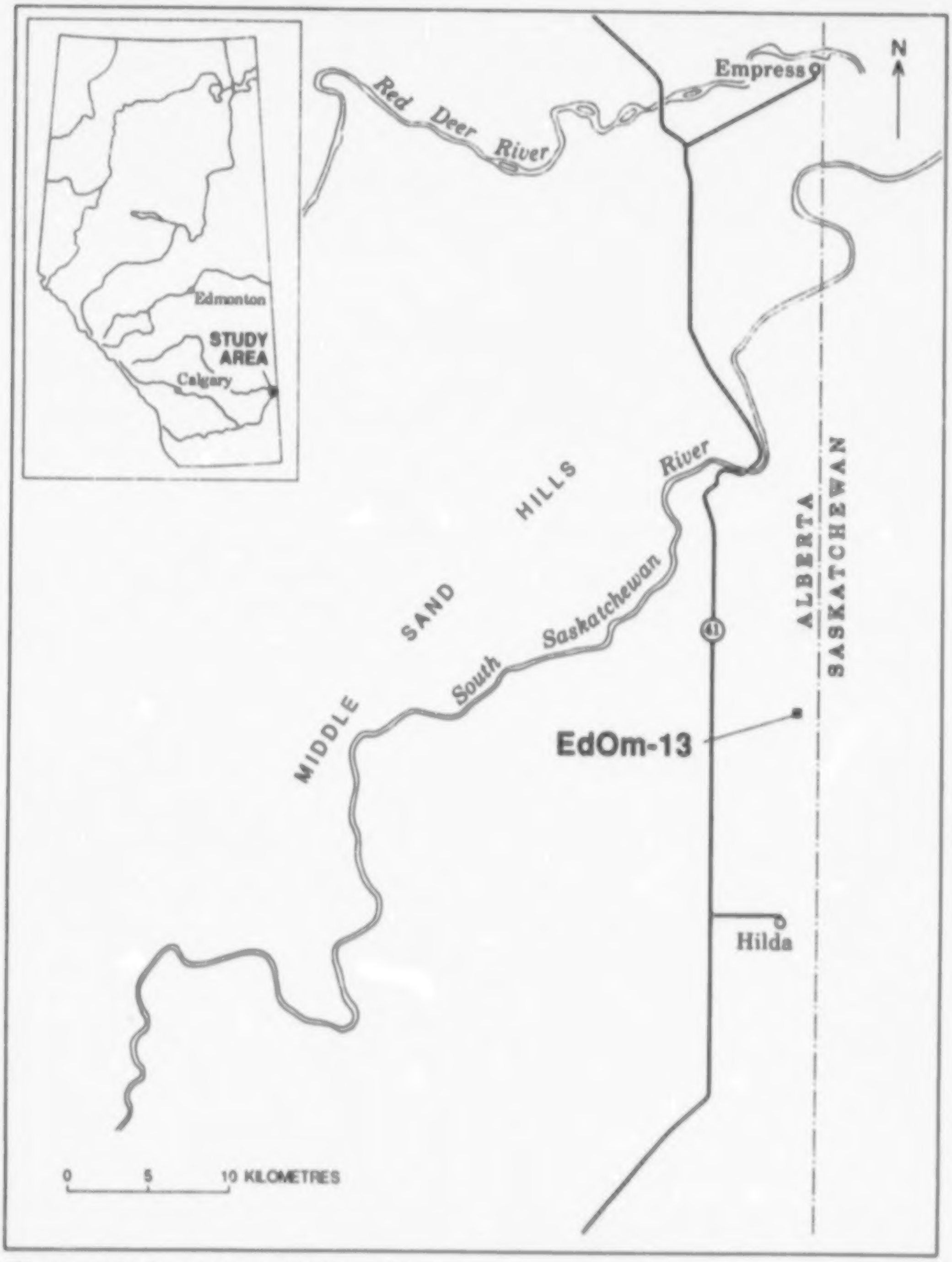
Edmonton
STUDY AREA
Calgary
Red Deer River
Empress
N
HILLS
SAND
MIDDLE
South Saskatchewan River
41
ALBERTA
SASKATCHEWAN
EdOm-13
Hilda
0 5 10 KILOMETRES

Figure 46. Location of EdOm-13.

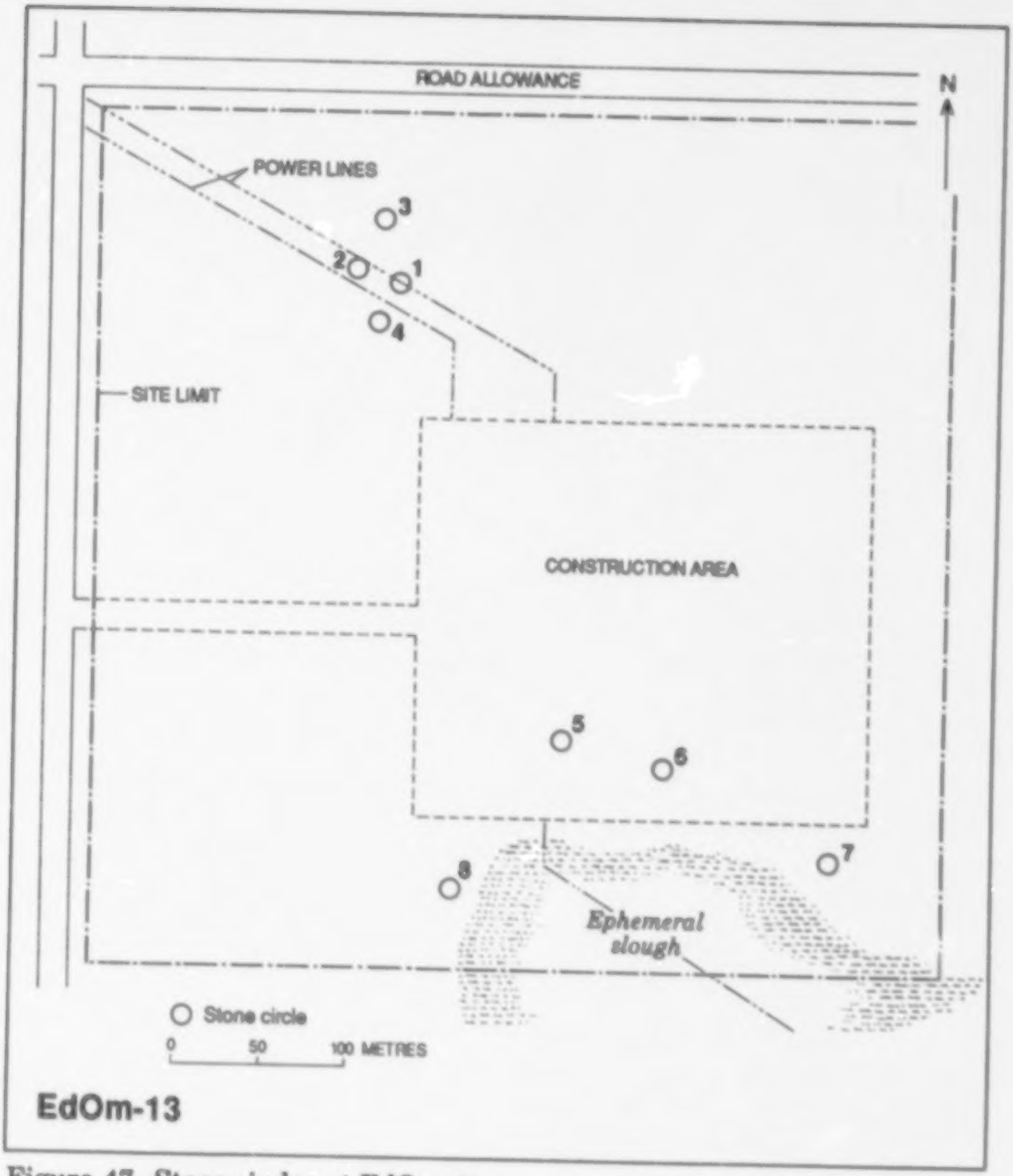
ROAD ALLOWANCE
N
POWER LINES
3
2
1
4
SITE LIMIT
CONSTRUCTION AREA
5
6
7
8
Ephemeral slough
○ Stone circle
0
50
100 METRES
EdOm-13

Figure 47. Stone circles at EdOm-13.

methods. This research is an attempt to develop and refine these systems of quantification further.

METHODOLOGY

FIELD METHODOLOGY

The technique used for data recording in the field was a variation on the radial Tipi-Quik mapping board developed by Smith (1974) and later refined by Brumley (Dau 1981). This system employs a square, flat board marked with an accurately depicted circle divided into 360°. A 5 m tape is tethered to the centre of the board, and the assembly is anchored in the approximate centre of a stone circle with the 0° mark oriented by compass to true north. Measurements of angle and distance then can be used to locate each rock precisely. This technique was developed originally to speed up and simplify in-field mapping of stone circles.

In this study, detailed maps were not produced in the field; rather, numeric data were recorded for each stone. Recording raw data in this fashion has two benefits: it is faster and consequently less expensive and, more importantly, it results in a data set that can be manipulated and analyzed at a much higher level of resolution than is possible with a simple planview drawing. In this study, the specific data recorded for each rock were relative location (angle and distance), depth of burial, and weight. Angle and distance were measured in degrees and centimetres from the arbitrarily established "field centre" to the perceived centre of mass of each stone. Depth of burial was measured by removing each stone and recording the deepest impression below the ground surface in centimetres. Rock weight was recorded to the nearest kilogram. Artifacts observed on the surface were plotted relative to the feature and collected.

POST-FIELD METHODOLOGY

The collected data were entered into an IBM PC-XT compatible computer operating in the MS-DOS environment. Data entry and subsequent manipulation, analysis and presentation made use of a combination of commercially available programs and custom written combination of commercially available programs and custom written software.

Data Transformation and Standardization

A major difficulty in stone circle studies has been the researchers' inability to determine a standardized, replicatable centre-point for the feature (Finnigan 1982). Since the centre point defines all subsequent investigative endeavours in most ring studies, such an inability can cause severe discontinuity within and between data sets. In order to minimize the data skew created by this problem, each feature data file from EdOm-13 was systematized by a custom written "Furthest Neighbour" analytical program. This program examined each mapped perimeter rock and measured its location relative to every other mapped perimeter rock in the feature. The most distant perimeter rock was paired with the stone under examination, and an imaginary line connecting the centre of mass of both rocks was calculated. The mid-point of this imaginary line was recorded automatically and, when all the rock pairings were identified, an averaged centre point was calculated. The entire data file for the feature then was transformed back into polar coordinates, based upon the newly calculated, totally replicatable centre point. The recentred data file then became the source file for all subsequent analyses and manipulation.

Summary statistics concerning the number, weight, depth and distribution of stones for each feature and each octant within each feature are reported in Tables 10 to 17. These statistical summaries include means (Avg), maximum values (Max), minimum values (Min), standard deviation (Std), totals (Tot) and percentages (%). These tables present basic information about the distribution of stones and the shape and size of each feature in a clear, concise fashion suitable for use by other analysts.

No attempt was made to collect interior or exterior dimensions during the course of this study, but both can be approximated by respectively subtracting or adding one standard deviation to the average distance per octant per ring. An exterior or interior dimension calculated in this fashion, unlike a more conventional subjective field measurement, has the considerable dual advantages of objectivity and replicatability.

Many researchers have argued, upon the basis of ethnographic evidence, that interior measurements are a more meaningful measure of cultural variability than other measures of size (Brumley and Dau 1988; Finnigan 1982; Quigg 1986; Quigg and Brumley 1984); however, there is still no a priori reason to suppose that stones were used only as exterior cover weights throughout all of prehistory. On the other hand, there are compelling reasons for not using subjective and nonreplicatable measurements as the basis for subsequent statistical manipulations and cultural generalizations. As a consequence, mean distance indices were employed exclusively as the unit of measure for all subsequent shape and size analyses in this study.

To present the collected data graphically, planview maps of each feature were produced directly from the numerical data files (Figures 48 and 49). These maps represent reasonably close approximations of the surface appearance of the mapped features. Each stone is represented by a simple, circular shape, and the size of each of these circles is proportional to the actual weight of the particular stone it represents. Although the map is not a "photo-image" of the feature (rock shape and orientation are not depicted), it is an accurate portrayal of the physical location and relative size of the constituent stones. These maps may be a more useful portrayal than conventional planviews because they are highly accurate depictions of relative rock size and location. Each feature map includes a large "cross-hair" oriented to the cardinal directions and located directly over the mathematically determined centre point. A circle indicates the average feature radius.

Three sets of proportional directional pie charts (rose charts) were generated to depict the number of stones, weight of stones, and physical distribution of stones within each octant of each feature (Figures 50, 52 and 54). In the case of number of rocks (Figure 50), the length of each "slice" of the rose chart is proportional to the number of stones in that particular octant as a percentage of the total number of stones in the specific feature. Similarly, in the case of weight of rocks (Figure 52), the length of each "slice" of the rose chart is proportional to the total weight of stones in that particular octant as a percentage of the total weight of stones in the specific feature. In the case of average distance (Figure 54), the length of each "slice" of the pie chart is proportional to the averaged distance from the mathematically derived centre to the perimeter rocks in each octant of the feature.

SITE DESCRIPTION

EdOm-13 is a small tipi ring/campsite located on the open prairie, approximately 12 km southeast of the South Saskatchewan River. The site lies 13.5 km north of the small community of Hilda and 1.5 km west of the Alberta-Saskatchewan border in NW-NW-12-19-1-W4M (Figure 46). The site is located in the eastern Alberta plains physiographic region and in the mixed prairie phytogeographic region. Surficial geology consists of a thick blanket of Late Pleistocene tills overlain by a very thin skiff of aeolian Holocene deposits. Eight stone circles were observed on the hummocky prairie surface in an area of approximately 90,000 square metres. These features appear to be separated into two geographically discrete "clusters" (Figure 47). The northern group, consisting of features 1 to 4, is a small, very "tight" cluster centred around a small saddle between two knoll tops to the north and south. The southern group, consisting of features 5 through 8, is a larger, "looser" cluster. The features in this second group appear to be distributed on the edge of a low rise along the north and west peripheries of a large, ephemeral prairie slough (now dry).

FEATURES DESCRIPTIONS

Feature 1

Feature 1 is a small (mean radius=2.09 m), poorly defined stone circle (Table 10; Figure 48A). No internal features are present. Twenty-one rocks are visible on the surface. The greatest number of rocks (n=4) are found in the south and west octants, while the fewest rocks (n=2) are found in the east octants. The maximum weight load (94 kg) is found in the west octant, while the minimum weight load (11 kg) is found in the north and northeast octants. The rocks are well buried, to an average depth of 15.4 cm. The longest axis of the features is the northeast-southwest (4.74 m), while the shortest axis is the southeast-northwest (3.93 m). The age and cultural affiliations of this feature are unknown.

Feature 2

Feature 2 is a very small (mean radius=1.84 m), poorly defined stone circle (Table 11; Figure 48B). No internal features are present. Twenty-five

Table 10. Summary statistics for Feature 1, EdOm-13.

Rock Weights:	Avg - 13.2 Max - 45 Min - 2 Std - 9.01	Rock Depths:	Avg - 15.4 Max - 23 Min - 12 Std - 2.50	Rock Distances:	Avg - 2.09 Max - 2.67 Min - 0.88 Std - 0.42

Octant	No. (Tot)	Weight (Tot)	No. (%)	Weight (%)	Depth (Avg)	Distance (Avg)	Distance (Max)	Distance (Min)	Distance (Std)
N	2	11	9.52	3.96	13	2.26	2.58	1.94	0.32
NE	2	11	9.52	3.96	13	2.10	2.16	2.03	0.07
E	1	13	4.76	4.68	16	1.86	1.86	1.86	0
SE	3	38	14.3	13.7	16.7	1.91	2.47	0.88	0.73
S	4	40	19.0	14.4	15.5	1.96	2.41	1.25	0.43
SW	2	25	9.52	8.99	14	2.64	2.67	2.61	0.03
W	4	94	19.0	33.8	17.5	2.10	2.3	1.8	0.20
NW	3	46	14.3	16.5	15.3	2.02	2.29	1.82	0.20
Totals	21	278							

Table 11. Summary statistics for Feature 2, EdOm-13.

Rock Weights:	Avg - 10.4 Max - 31 Min - 2 Std - 8.07	Rock Depths:	Avg - 13.5 Max - 21 Min - 7 Std - 3.79	Rock Distances:	Avg - 1.84 Max - 2.35 Min - 0.9 Std - 0.45

Octant	No. (Tot)	Weight (Tot)	No. (%)	Weight (%)	Depth (Avg)	Distance (Avg)	Distance (Max)	Distance (Min)	Distance (Std)
N	4	49	16	18.8	13.8	1.87	2.3	1.09	0.47
NE	3	28	12	10.7	12	1.98	2.22	1.65	0.24
E	2	43	8	16.5	18	1.32	1.56	1.07	0.25
SE	3	14	12	5.36	10.3	2.06	2.35	1.9	0.21
S	2	12	8	4.60	13	1.65	1.66	1.63	0.02
SW	3	36	12	13.8	12.7	1.7	2.12	1.18	0.39
W	6	43	24	16.5	13.7	1.79	2.31	0.9	0.56
NW	2	36	8	13.8	17	2.3	2.35	2.25	0.05
Totals	25	261							

(All weights are in kg; all depths are in cm; and all distances are in m.)

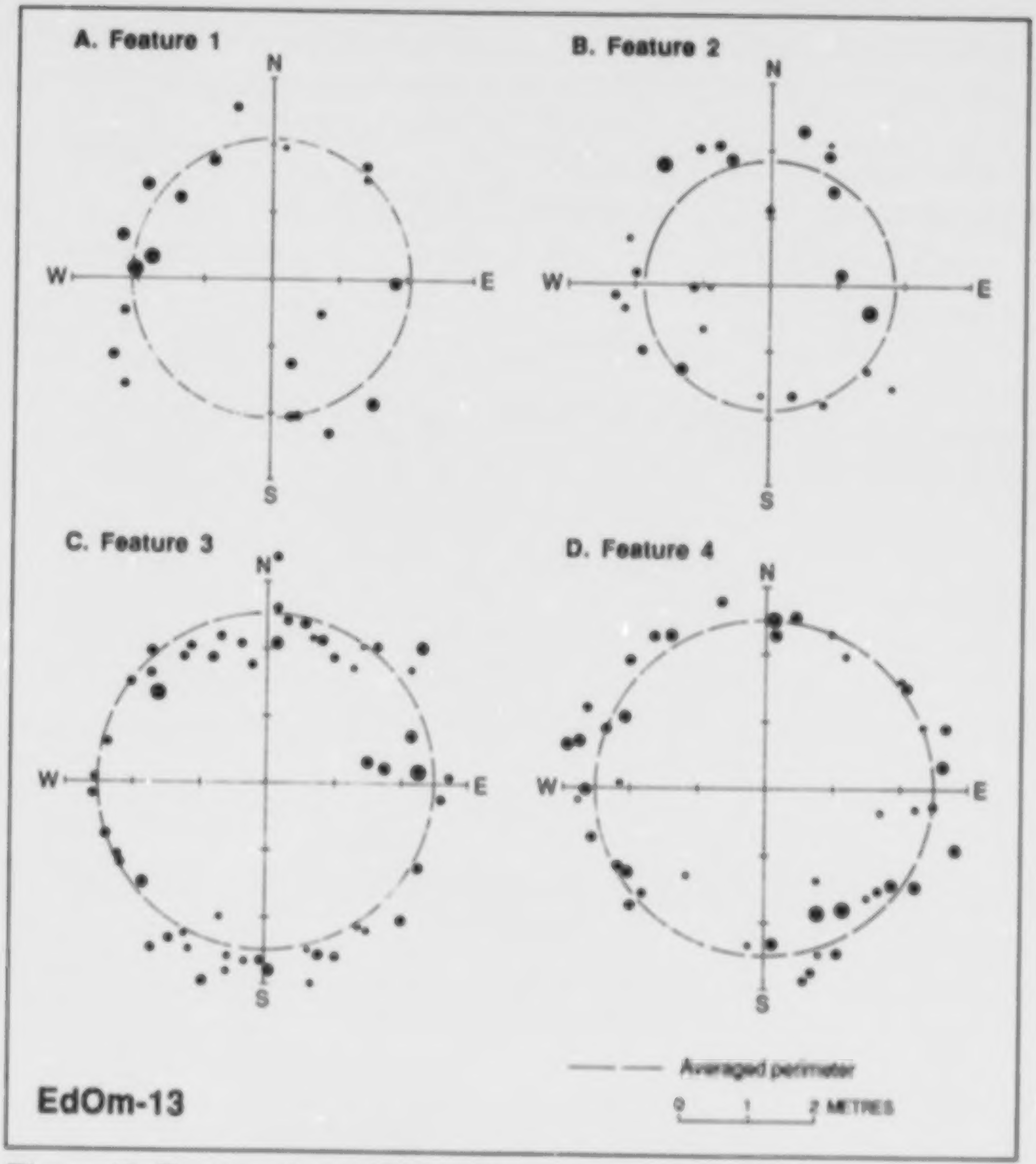
A. Feature 1
B. Feature 2
C. Feature 3
D. Feature 4
N
S
W
E
EdOm-13
Averaged perimeter
0
1
2 METRES

Figure 48. Features 1 to 4, EdOm-13.

rocks are visible on the surface. The greatest number of rocks (n=6) are found in the west octant, while the fewest rocks (n=1) are found in the east octant. The maximum weight load (49 kg) is found in the north octant, while the minimum weight load (12 kg) is found in the south octant. The rocks are well buried, to an average depth of 13.5 cm. The longest axis of the feature is the northwest-southeast (4.36 m), while the shortest axis is the east-west (3.11 m). The age and cultural affiliations of this feature are unknown.

Feature 3

Feature 3 is a small (mean radius=2.47 m), well-defined stone circle (Table 12; Figure 48C). No internal features are present. Fifty-six rocks are visible on the surface. The greatest number of rocks (n=12) are found in the south octant, while the fewest rocks (n=4) are found in the southeast and west octants. The maximum weight load (116 kg) is found in the northwest octant, while the minimum weight load (43 kg) is found in the southeast octant. The rocks are well buried, to an average depth of 13.2 cm. The longest axis of the feature is the northeast-southwest (5.11 m), while the shortest axis is the east-west (4.72 m). The age and cultural affiliations of this feature are unknown.

Feature 4

Feature 4 is a small (mean radius=2.47 m), well-defined stone circle (Table 13; Figure 48D). No internal features are present. Forty-seven rocks are visible on the surface. The greatest number of rocks (n=9) are found in the southeast octant, while the fewest rocks (n=4) are found in the north and northeast octants. The maximum weight load (196 kg) is found in the southeast octant, while the minimum weight load (30 kg) is found in the northeast octant. The rocks are well buried, to an average depth of 14.1 cm. The longest axis of the feature is the east-west (5.14 m), while the shortest axis is the northeast-southwest (4.77 m). The age and cultural affiliations of this feature are unknown.

Table 12. Summary statistics for Feature 3, EdOm-13.

Rock Weights:		Rock Depths:		Rock Distances:	
	Avg - 11.2 Max - 47 Min - 1 Std - 7.55		Avg - 13.2 Max - 24 Min - 6 Std - 3.00		Avg - 2.47 Max - 3.32 Min - 1.53 Std - 0.33

Octant	No. (Tot)	Weight (Tot)	No. (%)	Weight (%)	Depth (Avg)	Distance (Avg)	Distance (Max)	Distance (Min)	Distance (Std)
N	10	98	17.9	15.6	12	2.34	3.32	1.76	0.39
NE	6	57	10.7	9.06	13.5	2.[illegible]0	3.03	2.09	0.33
E	6	101	10.7	16.1	14	2.18	2.71	1.53	0.42
SE	4	43	7.14	6.84	11.3	2.63	2.83	2.49	0.13
S	12	79	21.4	12.6	12.8	2.67	3.06	2.08	0.24
SW	7	72	12.5	11.4	13.4	2.61	2.99	2.35	0.20
W	4	63	7.14	10.0	14.3	2.54	2.61	2.45	0.06
NW	7	116	12.5	18.4	14.9	2.30	2.57	2.02	0.19
Totals	56	629							

Table 13. Summary statistics for Feature 4, EdOm-13.

Rock Weights:		Rock Depths:		Rock Distances:	
	Avg - 15.2 Max - 54 Min - 3 Std - 11.1		Avg - 14.1 Max - 28 Min - 4 Std - 4.78		Avg - 2.47 Max - 2.98 Min - 1.54 Std - .32

Octant	No. (Tot)	Weight (Tot)	No. (%)	Weight (%)	Depth (Avg)	Distance (Avg)	Distance (Max)	Distance (Min)	Distance (Std)
N	4	95	8.51	13.3	15.8	2.52	2.8	2.26	0.19
NE	4	30	8.51	4.20	10.5	2.46	2.56	2.27	0.12
E	7	85	14.9	11.9	12.6	2.49	2.96	1.73	0.38
SE	9	196	19.1	27.5	16.3	2.20	2.66	1.54	0.32
S	6	51	12.8	7.14	13	2.60	2.86	2.29	0.22
SW	5	69	10.6	9.66	15.6	2.31	2.63	1.74	0.30
W	7	99	14.9	13.9	14.3	2.65	2.98	2.15	0.24
NW	5	89	10.6	12.5	13	2.67	2.88	2.32	0.19
Totals	47	714							

(All weights are in kg; all depths are in cm; and all distances are in m.)

Feature 5

Feature 5 is a moderate-sized (mean radius=2.51 m), well-defined stone circle (Table 14; Figure 49A). No internal features are present. Sixty-three rocks are visible on the surface. The greatest number of rocks (n=10) are found in the north, west, southwest and northwest octants, while the fewest rocks (n=4) are found in the southeast octant. The maximum weight load (115 kg) is found in the northeast octant, while the minimum weight load (23 kg) is found in the southeast octant. The rocks are well buried, to an average depth of 11.9 cm. The longest axis of the feature is the north-south (5.14 m), while the shortest axis is the east-west (4.81 m). The age and cultural affiliations of this feature are unknown.

Feature 6

Feature 6 is a moderate-sized (mean radius=2.83 m), well-defined stone circle (Table 15; Figure 49B). Forty-seven rocks are visible on the surface. The greatest number of rocks (n=10) are found in the northwest octant, while the fewest rocks (n=0) are found in the northeast octants. The maximum weight load (108 kg) is found in the southwest octant, while the minimum weight load (39 kg) is found in the north octant. The rocks are well buried, to an average depth of 14.9 cm. The longest axis of the feature is the southeast-northwest (5.76 m), while the shortest axis is the east-west (5.66 m). The age and cultural affiliations of this feature are unknown.

Feature 7

Feature 7 is a moderate-sized (mean radius=2.49 m), reasonably well defined stone circle (Table 16; Figure 49C). No internal features are present. Thirty rocks are visible on the surface. The greatest number of rocks (n=6) are found in the southwest and northwest octants, while the fewest rocks (n=1) are found in the southeast octant. The maximum weight load (86 kg) is found in the northwest octant, while the minimum weight load (6 kg) is found in the southeast octant. The rocks are well buried, to an average depth of 12.9 cm. The longest axis of the feature is the northeast-southwest (5.18 m), while the shortest axis is the north-south (4.86 m). The age and cultural affiliations of this feature are unknown.

Table 14. Summary statistics for Feature 5, EdOm-13.

Rock Weights:	Avg - 8.49 Max - 28 Min - 1 Std - 5.25	Rock Depths:	Avg - 11.9 Max - 18 Min - 4 Std - 2.78	Rock Distances:	Avg - 2.51 Max - 3.54 Min - 0.83 Std - 0.49

Octant	No. (Tot)	Weight (Tot)	No. (%)	Weight (%)	Depth (Avg)	Distance (Avg)	Distance (Max)	Distance (Min)	Distance (Std)
N	10	115	15.9	21.5	13.3	2.51	2.89	1.43	0.40
NE	5	64	7.94	12.0	14	2.67	3.04	2.51	0.19
E	9	75	14.3	14.0	10.6	2.35	2.89	1.27	0.53
SE	4	23	6.35	4.30	9.75	2.46	3.31	0.83	0.96
S	5	69	7.94	12.9	12.2	2.63	2.74	2.52	0.08
SW	10	85	15.9	15.9	13	2.41	3.09	1.8	0.33
W	10	44	15.9	8.22	11	2.46	3.19	1.17	0.53
NW	10	60	15.9	11.2	10.9	2.66	3.54	1.89	0.50
Totals	63	535							

Table 15. Summary statistics for Feature 6, EdOm-13.

Rock Weights:	Avg - 11.9 Max - 34 Min - 4 Std - 7.01	Rock Depths:	Avg - 14.9 Max - 24 Min - 10 Std - 2.62	Rock Distances:	Avg - 2.83 Max - 3.76 Min - 2.16 Std - 0.36

Octant	No. (Tot)	Weight (Tot)	No. (%)	Weight (%)	Depth (Avg)	Distance (Avg)	Distance (Max)	Distance (Min)	Distance (Std)
N	5	39	10.6	6.95	13.4	3.06	3.29	2.87	0.13
E	8	76	17.0	13.5	13.6	2.82	3.44	2.47	0.31
SE	7	62	14.9	11.1	13.9	2.91	3.76	2.48	0.38
S	6	99	12.8	17.6	15.3	2.61	2.88	2.21	0.22
SW	5	108	10.6	19.3	16.4	2.74	3.47	2.20	0.43
W	6	92	12.8	16.4	15.3	2.84	3.69	2.16	0.54
NW	10	85	21.3	15.2	16	2.85	3.28	2.54	0.25
Totals	47	561							

(All weights are in kg; all depths are in cm; and all distances are in m.)

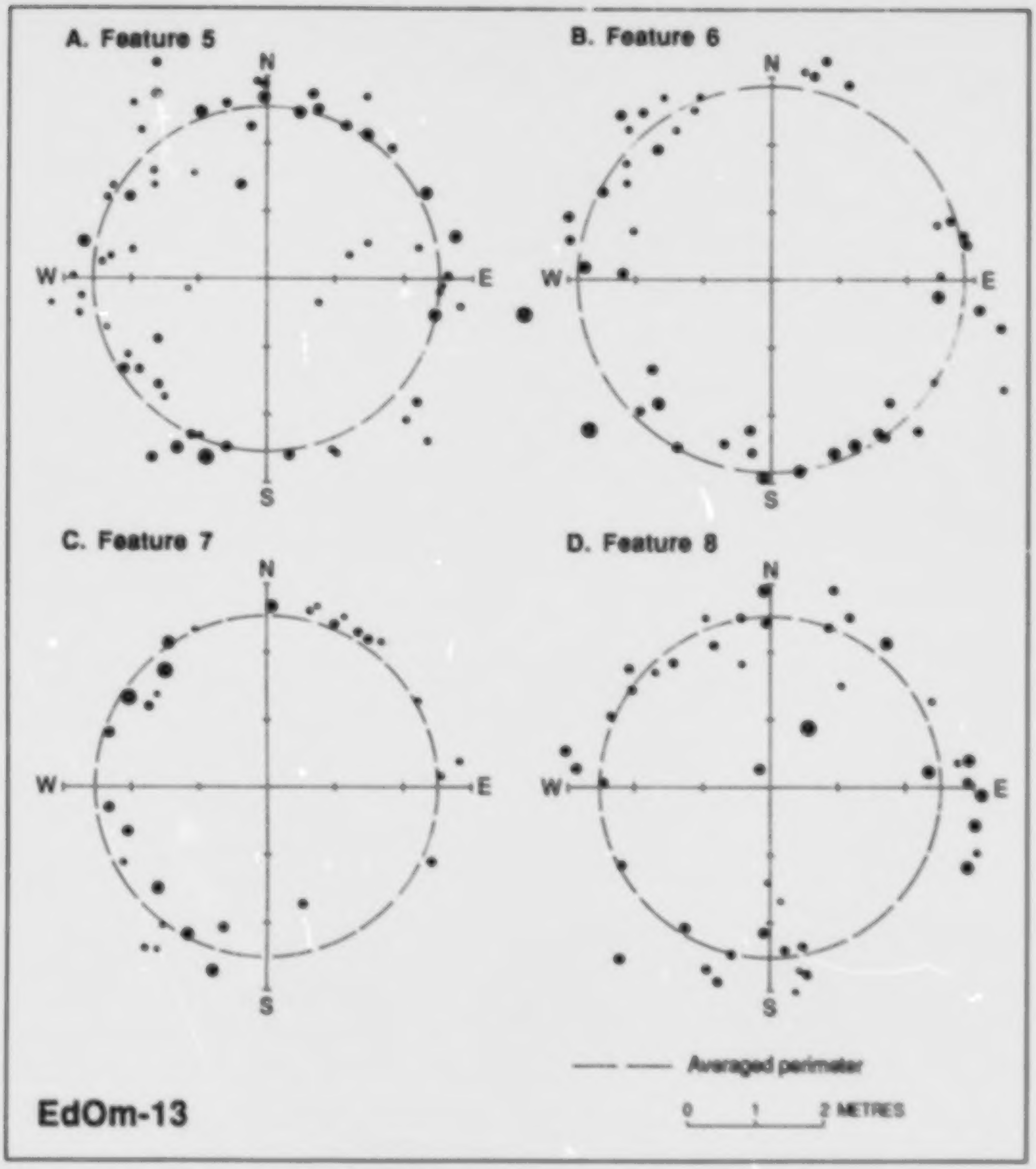
A. Feature 5
B. Feature 6
C. Feature 7
D. Feature 8
N
S
E
W
Averaged perimeter
0
1
2 METRES
EdOm-13

Figure 49. Features 5 to 3, EdOm-13.

Table 16. Summary statistics for Feature 7, EdOm-13.

Rock Weights:	Avg - 8.8 Max - 30 Min - 1 Std - 8.00	Rock Depths:	Avg - 12.9 Max - 25 Min - 8 Std - 4.38	Rock Distances:	Avg - 2.49 Max - 2.96 Min - 1.76 Std - 0.26

Octant	No. (Tot)	Weight (Tot)	No. (%)	Weight (%)	Depth (Avg)	Distance (Avg)	Distance (Max)	Distance (Min)	Distance (Std)
N	4	26	13.3	9.85	11.5	2.64	2.73	2.56	0.06
NE	5	17	16.7	6.44	11.4	2.62	2.71	2.51	0.07
E	2	7	6.67	2.65	11	2.68	2.82	2.53	0.15
SE	1	6	3.33	2.27	12	2.60	2.60	2.60	0
S	3	34	10	12.9	15.3	2.22	2.77	1.76	0.42
SW	6	52	20	19.7	12.2	2.56	2.96	2.19	0.27
W	3	36	10	13.6	15.7	2.31	2.43	2.16	0.11
NW	6	86	20	32.6	13.8	2.35	2.59	2.12	0.18
Totals	30	264							

(All weights are in kg; all depths are in cm; and all distances are in m.)

Feature 8

Feature 8 is a moderate-sized (mean radius=2.51 m), reasonably well defined stone circle (Table 17; Figure 49D). No internal features are present. Forty-four rocks are visible on the surface. The greatest number of rocks (n=11) are found in the south octant, while the fewest rocks (n=0) are found in the southeast octant. The maximum weight load (102 kg) is found in the east octant, while the minimum weight load (36 kg) is found in the west octant. The rocks are well buried, to an average depth of 12.5 cm. The longest axis of the feature is the east-west (5.73 m), while the shortest axis is the north-south (4.91 m). The age and cultural affiliations of this feature are unknown.

FEATURE COMPARISONS

The following statements of similarity are based upon the results of four separate cluster analyses performed using the Cluster module of SYSTAT (Wilkinson 1987). Each cluster analysis was calculated using

Table 17. Summary statistics for Feature 8, EdOm-13.

Rock Weights:	Avg - 10.4 Max - 42 Min - 0 Std - 7.57	Rock Depths:	Avg - 12.5 Max - 26 Min - 3 Std - 4.39	Rock Distances:	Avg - 2.51 Max - 3.33 Min - 0.34 Std - 0.57

Octant	No. (Tot)	Weight (Tot)	No. (%)	Weight (%)	Depth (Avg)	Distance (Avg)	Distance (Max)	Distance (Min)	Distance (Std)
N	8	85	18.2	18.5	11.6	2.51	3.03	1.86	0.34
NE	5	77	11.4	16.8	14.4	2.2	2.73	1.05	0.67
E	8	102	18.2	22.2	14.6	2.93	3.17	2.33	0.26
S	11	70	25	15.3	9.55	2.40	2.98	1.36	0.50
SW	3	40	6.82	8.71	14	2.73	3.33	2.38	0.43
W	3	36	6.82	7.84	15.3	2.8	3.07	2.46	0.25
NW	6	49	13.6	10.7	12.7	2.14	2.71	0.34	0.81
Totals	44	459							

(All weights are in kg; all depths are in cm; and all distances are in m.)

nonstandardized data from all octants of the eight features at EdOm-13. Three data sets were employed in the analyses: number of rocks per octant, weight of rock per octant and average distance to perimeter rocks per octant (Tables 10 to 17; Figures 50, 52 and 54). In each case, the amalgamation method used was Single Linkage (Nearest Neighbour) joining. Two different distance metrics, Normalized Euclidean Distance and 1-Pearson Product Moment Correlation Coefficient (1-*r*), were employed. Cluster analyses performed using Normalized Euclidean Distance as the distance metric are most sensitive to size differences between the profiles under consideration (Aldenderfer and Blashfield 1984:22-28); that is, clusters based upon Euclidean distances are founded more upon the magnitude of differences than upon the pattern of differences. Cluster analyses performed using 1-*r* are more sensitive to shape differences between profiles (Aldenderfer and Blashfield 1984:22-28). In other words, clusters based upon Pearson coefficients are founded more upon the pattern of differences than upon the extent of those differences.

In the case of number and weight of rocks per octant, the concern was to measure relative similarity between the shape of the profiles. It was deemed more important to recognize the pattern of "heavy" and "light" octants than it was to distinguish relative degrees of "heaviness" or "lightness." Consequently, 1-*r* was the distance metric employed for both number of rocks per octant and weight of rock per octant.

In the case of average distance per octant, both shape and size differences in the profiles were deemed to be potentially significant concerns. Consequently, two independent cluster analyses were performed using average distance per octant measurements. The cluster analysis executed using Euclidean distances reflects differences in stone circle size while the cluster analysis conducted using 1-*r* reflects similarities in stone circle shape.

Number of Rocks Per Octant

In terms of the number of rocks and their distribution, Feature 1 is most like Feature 2 (*J*=0.67); Feature 2 is most like Feature 1 (*J*=0.67); Feature 3 is most like Feature 8 (*J*=0.16); Feature 4 is most like Feature 6 (*J*=0.55); Feature 5 is most like Feature 7 (*J*=0.54); Feature 6 is most like Feature 4 (*J*=0.55); Feature 7 is most like Feature 5 (*J*=0.54); and Feature 8 is most like Feature 3 (*J*=0.16) (Figure 50). The preceding relationships were calculated using 1-Pearson Product Moment Correlation Coefficient as the distance metric and Single Linkage (Nearest Neighbour) as the clustering method. The dendrogram in Figure 51 illustrates these associations.

Weight of Rock Per Octant

In terms of the weight of rocks and their distribution, Feature 1 is most like Feature 6 (*J*=0.50); Feature 2 is most like Feature 3 (*J*=0.44); Feature 3 is most like Feature 2 (*J*=0.44); Feature 4 is unlike all other features (*J*=0.76); Feature 5 is most like Feature 8 (*J*=0.29); Feature 6 is most like Feature 1 (*J*=0.50); Feature 7 is most like features 2, 3, 5 and 8 (*J*=0.44); and Feature 8 is most like Feature 5 (*J*=0.29) (Figure 52). The preceding relationships were calculated using 1-Pearson Product Moment Correlation Coefficient as the distance metric and Single Linkage (Nearest Neighbour) as the clustering method. The dendrogram in Figure 53 illustrates these associations.

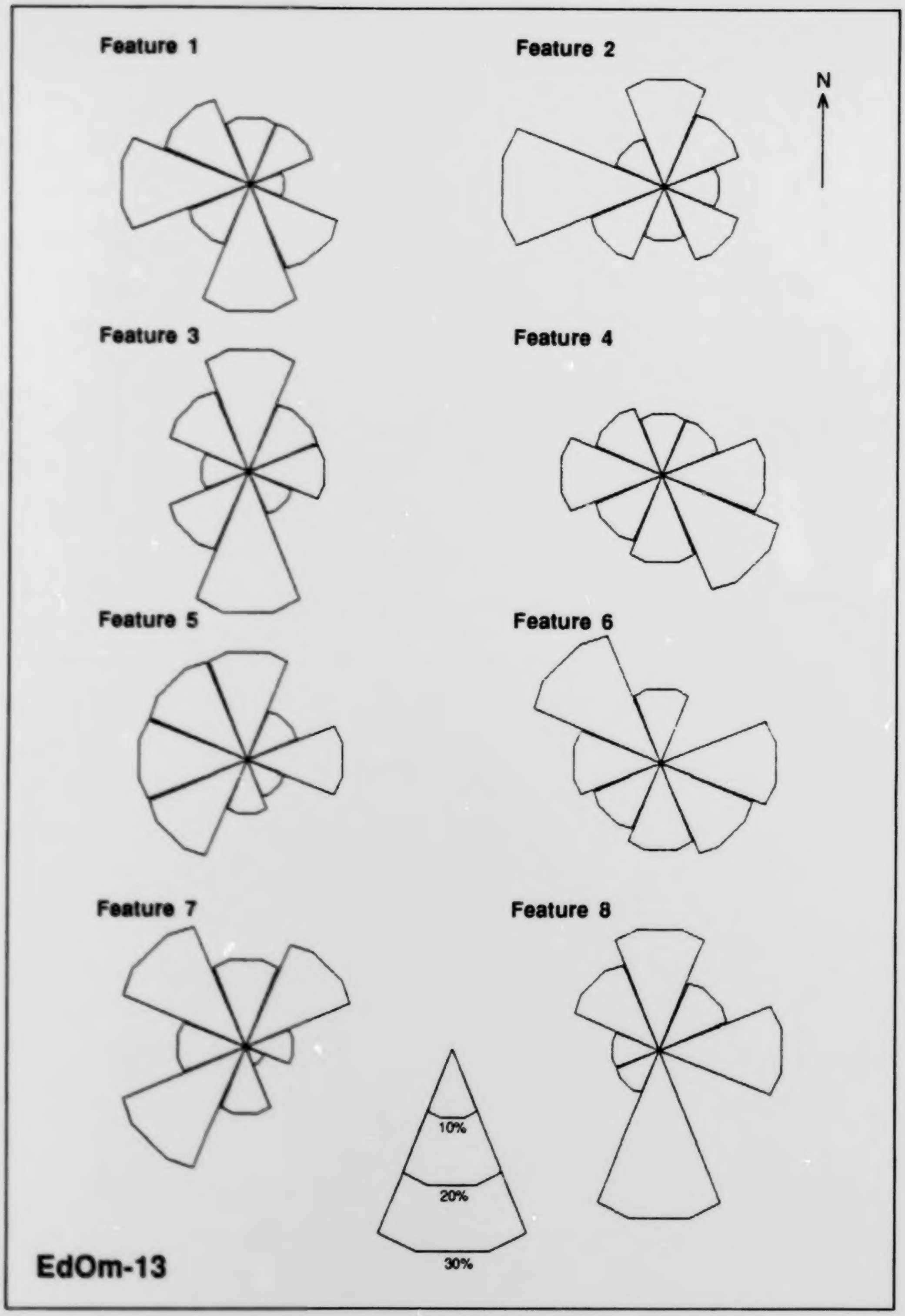

Figure 50. Number of rocks per octant, EdOm-13.

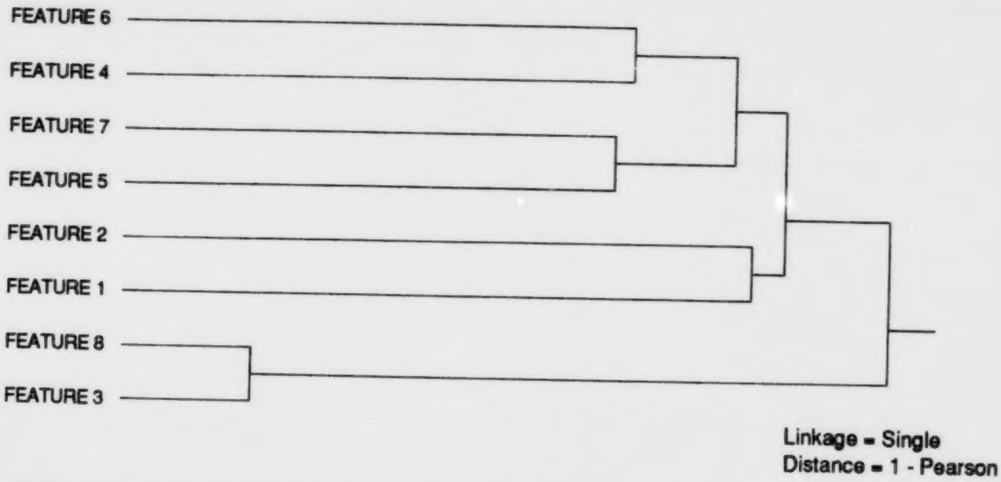

Figure 51. Dendogram of number of rocks per octant.

Distance Per Octant (Shape)

In terms of the shape of the features, Feature 1 is most like features 2, 4, 5 and 6 (*J*=0.66); Feature 2 is most like Feature 5 (*J*=0.37); Feature 3 is most like features 1, 2, 4, 5, 6 and 8 (*J*=0.74); Feature 4 is most like Feature 8 (*J*=0.39); Feature 5 is most like Feature 2 (*J*=0.37); Feature 6 is unlike all other features (*J*=0.95); Feature 7 is most like features 1, 2, 3, 4, 5 and 8 (*J*=0.86); and Feature 8 is most like Feature 4 (*J*=0.39) (Figure 54). The preceding relationships were calculated using 1-Pearson Product Moment Correlation Coefficient as the distance metric and Single Linkage (Nearest Neighbour) as the clustering method. The dendrogram in Figure 55 illustrates these associations.

Distance Per Octant (Size)

In terms of the size of the features, Feature 1 is most like features 2, 3, 4, 5 and 7 (*J*=0.45); Feature 2 is most like features 1, 3, 4, 5 and 7 (*J*=0.45); Feature 3 is most like features 4 and 5 (*J*=0.19); Feature 4 is most like Feature 5 (*J*=0.15); Feature 5 is most like Feature 4 (*J*=0.15); Feature 6 is unlike all other features (*J*=0.95); Feature 7 is most like features 3, 4 and 5 (*J*=0.24); and Feature 8 is most like features 1, 2, 3, 4, 5 and 7 (*J*=0.83) (Figure 54). The preceding relationships were calculated using Euclidean Distance as the distance metric and Single Linkage (Nearest Neighbour) as

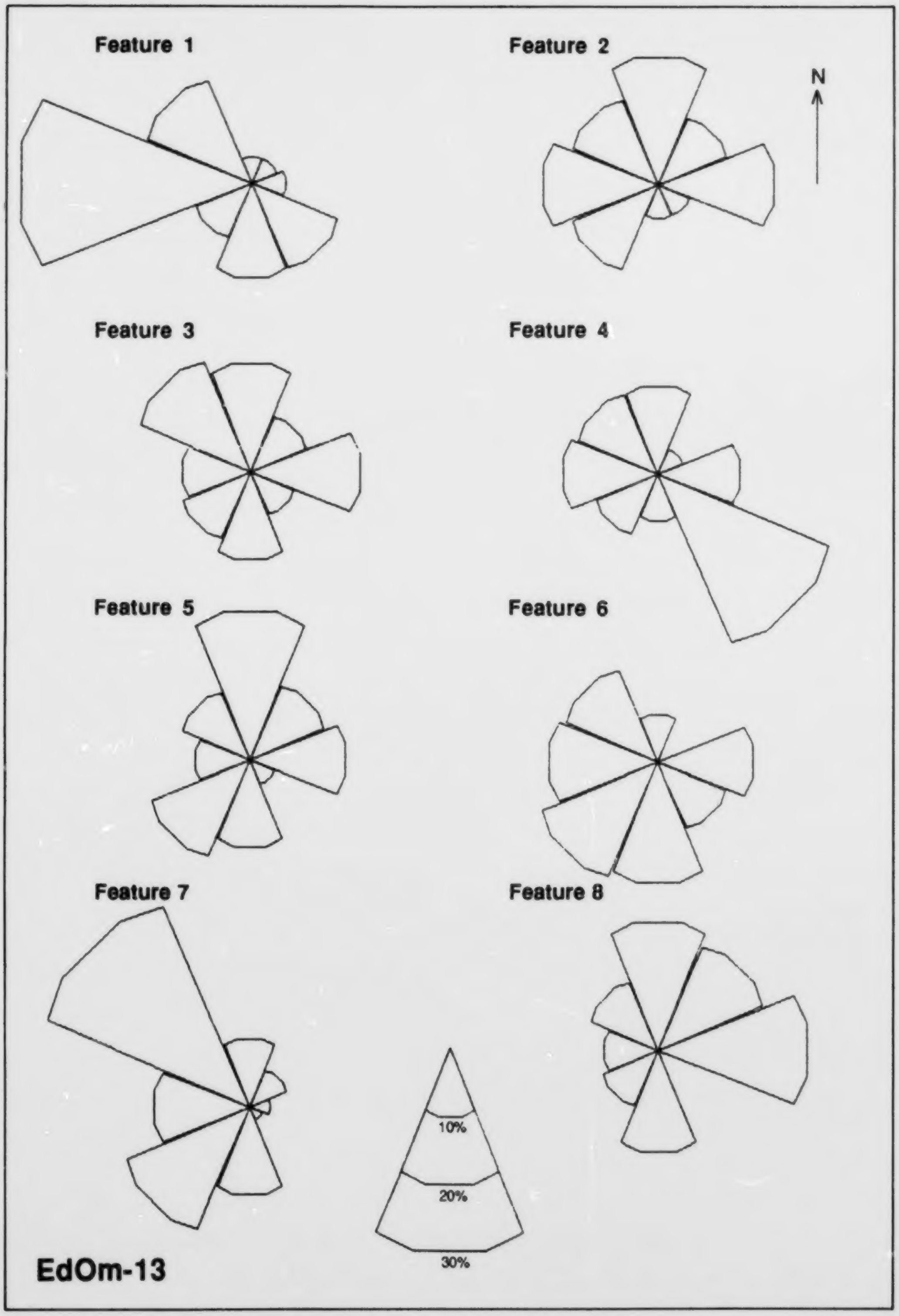

Figure 52. Weight of rock per octant, EdOm-13.

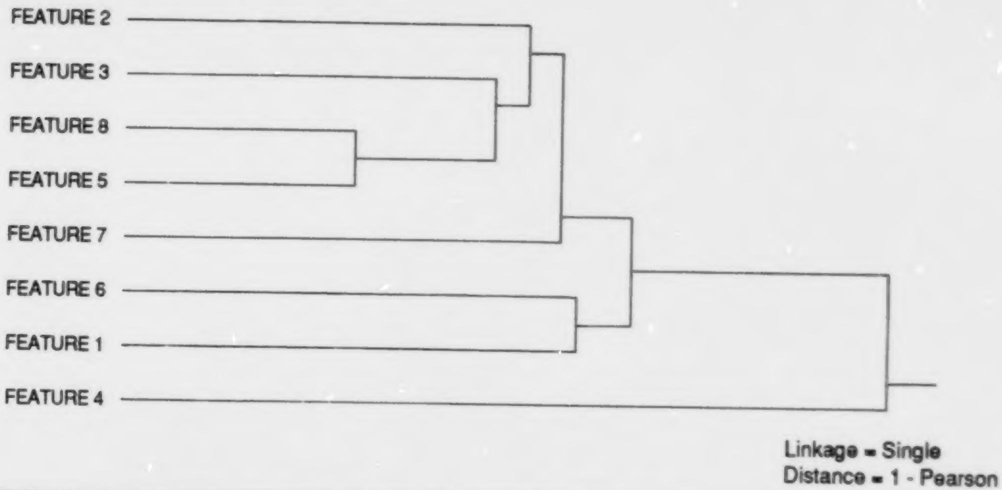

Figure 53. Dendogram of weight of rock per octant.

the clustering method. The dendrogram in Figure 56 illustrates these associations.

DISCUSSION AND INTERPRETATIONS

CONTEMPORANEITY

The geographical distribution of the eight features at EdOm-13 in two separate areas (Figure 47) implies that these two groups of stone circles may represent non-contemporaneous site occupations. This hypothesis is in agreement with Brumley and Dau's suggestion that the most common size of prehistoric encampments was four or fewer lodges (Brumley and Dau 1988). Quigg (1986:43) has argued that differential depth of rock burial between features may be used as a means of distinguishing between non-contemporary features at a single site if all other factors are equal. Although the average depth of burial of the northern group of features at EdOm-13 is somewhat greater than the average depth of burial of the southern group (14.05 and 13.05 cm, respectively), a *t*-test (t=1.23, degrees of freedom=6, $t_{0.10}$=3.71) between these two clusters indicates that the difference is not significant statistically. Consequently, although the two groups of features at EdOm-13 may represent different episodes of site

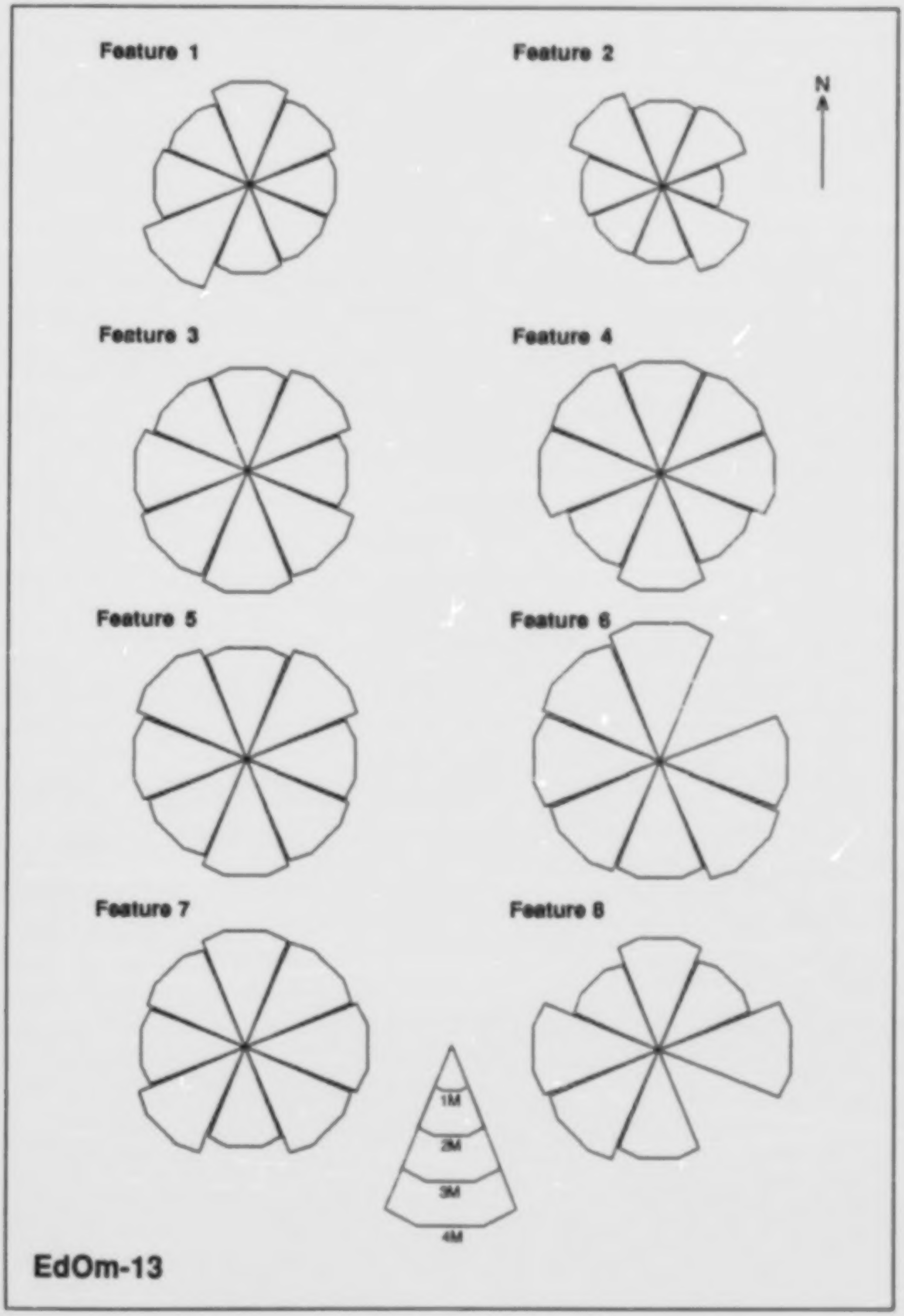

Figure 54. Average distance per octant, EdOm-13.

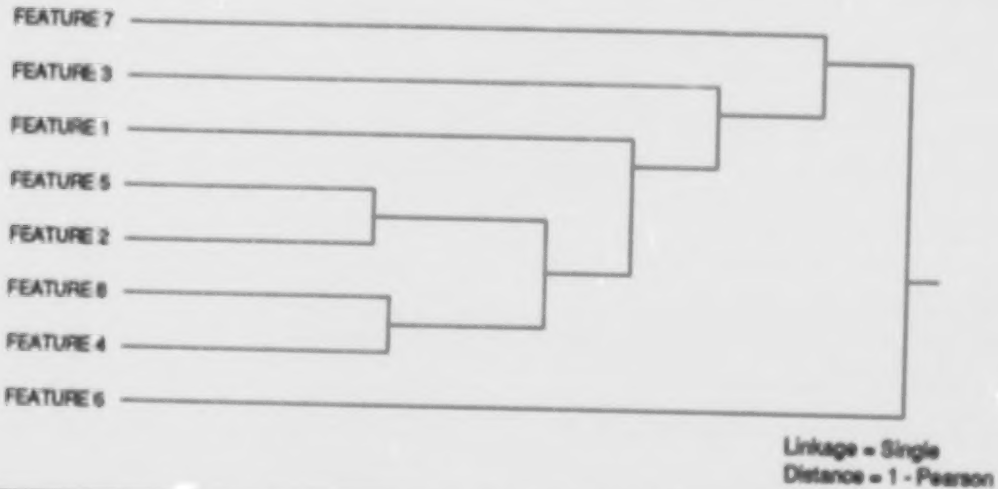
FEATURE 7
FEATURE 3
FEATURE 1
FEATURE 5
FEATURE 2
FEATURE 8
FEATURE 4
FEATURE 6
Linkage = Single
Distance = 1 - Pearson

Figure 55. Dendogram of average distance to perimeter rocks per octant (shape)

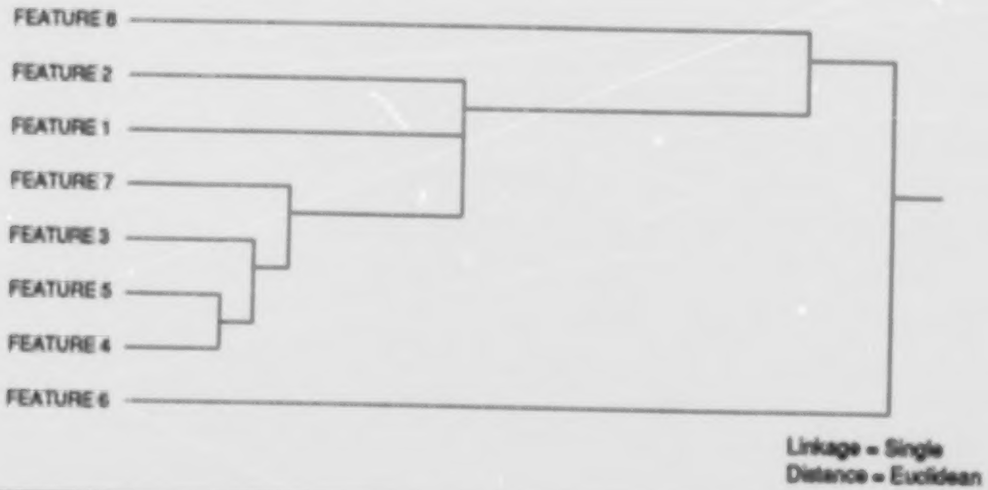
FEATURE 8
FEATURE 2
FEATURE 1
FEATURE 7
FEATURE 3
FEATURE 5
FEATURE 4
FEATURE 6
Linkage = Single
Distance = Euclidean

Figure 56. Dendogram of average distance to perimeter rocks per octant (size).

occupation and use, the difference in relative depths of stone burial between the two groups cannot support this hypothesis directly.

The results of the independent cluster analyses also fail to support this two-occupation model (Figures 51, 53, 55 and 56). In no instance did a clear separation in form exist between the northern and southern groups of features. Features 1 to 4 show no consistent pattern in the number, weight or distribution of stones about the perimeter which would help distinguish them from features 5 to 9.

In order to test Quigg's postulation that depth of burial may have a simple predictive relationship with relative feature age, a linear regression analysis, comparing the depth of burial and the weight of all the individual stones recorded for all eight features at EdOm-13, was conducted. This analysis indicated a moderate to high relationship (*r*=+0.71) between rock weight and depth of burial. These results indicate that individual rock weight can be used as a reasonably powerful predictor of depth of burial. If we compare average weight per octant to average depth per octant in the same fashion as above, an even higher relationship is found to exist (*r*=+0.73). It seems unlikely, therefore, that average depth of rock burial will function as an adequate predictor of relative feature age unless variations in average weight per stone circle are also taken into account.

An examination of Quigg's original data from the Ross Glen site confirms this difficulty (Quigg 1982:152). The two features (16 and 17) identified by Quigg as different (shallower) were also relatively "light" features (average rock weights of 5.56 kg and 5.29 kg as compared to a site average of 6.4 kg); therefore, it seems probable that these two features were buried more shallowly than others because they weighed less, not because they were in use during a different period.

LODGE STRUCTURE

Brumley and Dau (1988:117-119) have argued, upon the basis of both ethnographic analogy and archaeological evidence, that a specific conformation may be expected in a "representative" stone circle. This expected conformation includes the combination of a number of elements. The maximum number of stones per octant is expected to be found in the octant directly opposite the octant containing the minimum number of stones. The minimum value is interpreted as representing a doorway, while the maximum value is interpreted as the windward side. Moreover, the longest diameter is expected to coincide with this maximum-minimum axis, while the shortest diameter is expected to be found perpendicular to both. These predicted commonalities are not apparent in the stone circles at EdOm-13. Only two of the eight features show a clear opposition of maximum and minimum stone counts. (One out of seven would be the expected outcome of a totally random assortment.) In three of the eight cases, the longest diameter is found perpendicular to the shortest axis. (One out of three would be the expected outcome of a totally random assortment.) Finally, in none of the eight cases did the maximum-minimum axis and the longest axis coincide. (One out of 28 would be the expected outcome of a totally random assortment.) Consequently, it is apparent that the eight features at EdOm-13 do not fit Brumley and Dau's general model of expected stone circle conformation. This would suggest that either the model of human behavior underlying Brumley and Dau's model is inaccurate or the post-use transformations affecting stone circles are more complex than currently recognized.

SEASONALITY

It is often suggested that preferential weight loadings in specific stone circle octants may reflect wind direction at the time of occupation and, by extension, may also reflect season of occupation. While this avenue of research has considerable potential and has been successful in certain studies (e.g., Brumley and Dau 1988; Davis 1983; Hanna n.d.), the data from EdOm-13 do not appear to be conducive to such a study. Although it is extremely unlikely that the eight features at EdOm-13 represent seven independent reoccupations of the same site at different times and under different wind conditions, this is precisely the situation indicated by the weight loadings observed in the eight features. Maximum weight loadings are encountered in seven of the eight possible compass octants (Figure 52). Only the southern octant is excluded. With such a wide diversity in weight distributions and no possibility of correlation with prevailing wind patterns, statements cannot be made at this time regarding the seasonality of the prehistoric occupation(s) at EdOm-13.

CONCLUSIONS

Although the author concurs with the majority of researchers in maintaining that there is a great deal of significant and decipherable cultural information stored in architectural remains (like stone circles), this information cannot be extracted using the minimalist and subjective techniques that are now becoming prevalent. Even the simplest of explanatory models will not be confuted by data that is collected in a subjective and nonreplicatable fashion. It should be obvious from the results of this study that architectural analysis, although powerful, is still unable to answer fundamental research questions. Only by conducting these architectural analyses in tandem with more conventional forms of archaeological inquiry can these questions be addressed convincingly.

ACKNOWLEDGEMENTS

The author would like to thank Ed McCullough, Gloria Fedirchuk and Glenn Stuart of Fedirchuk, McCullough and Associates Ltd. and Jim Crinklaw of Alberta Power Limited for their assistance and encouragement in the preparation and execution of this study.

A WEDGE-SHAPED MICROBLADE CORE, FORT VERMILION, ALBERTA

By
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Archaeological Survey of Alberta

INTRODUCTION

The distribution and variability of microlithic technologies in Alberta is still poorly understood. This report describes one wedge-shaped microblade core that was recovered during an archaeological survey in the Fort Vermilion region of Alberta in 1988.

ARCHAEOLOGICAL CONTEXT

The microcore was recovered from the surface of a ploughed field at a large, prehistoric site (IcQa-11) on the north edge of Gull Lake near Fort Vermilion. The site also stretches along the north edge of a small creek that drains into Gull Lake from the west. Extensive survey of the Fort Vermilion area indicates that this site, which covers 40-50 acres, is one of the largest known sites in the region. While Oxbow, side-notched and stemmed points, as well as a number of other stone tools, have been recovered from the Gull Lake site, parts of the site near the edges of Gull Lake and the creek likely are still undisturbed.

CORE MANUFACTURE AND PHYSICAL ATTRIBUTES

Drawings and photographs of the primary elements of the microcore are shown in Figures 57 and 58. The measurements of the basic microcore attributes are presented in Table 18.

The microcore is made from a creamy coloured, solidified mudstone that has a relatively wide distribution in the Peace River valley. (It occurs as far east as Peace Point [Stevenson, personal communication].) A number of dark spots of a residue are found primarily on the reverse side of the core near the base (Figures 57 and 58). It might be possible to date the

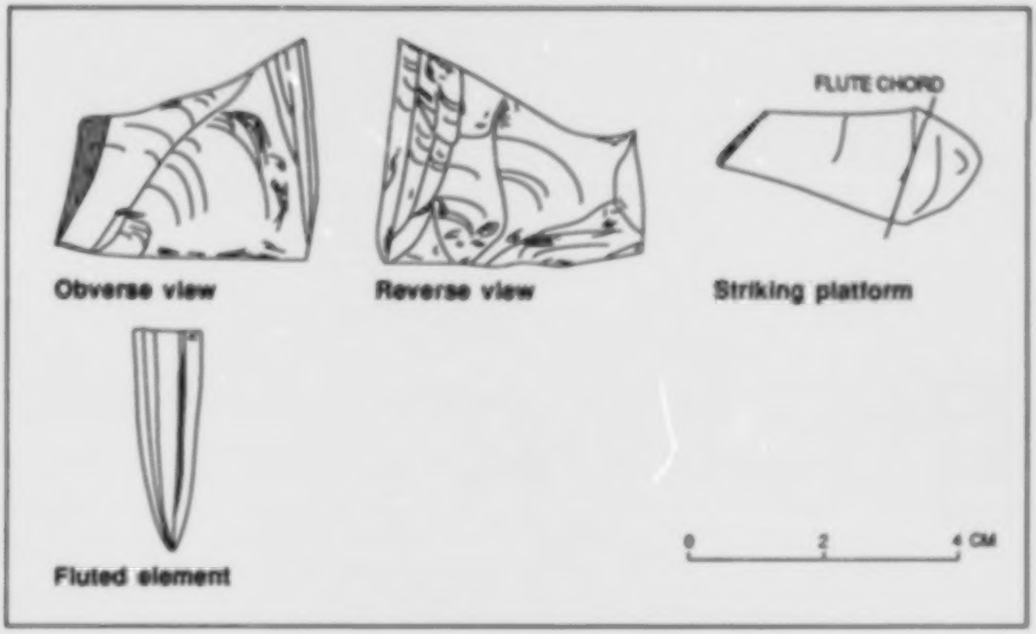

FLUTE CHORD
Obverse view
Reverse view
Striking platform
Fluted element
0
2
4 CM

Figure 57. Sketch of Fort Vermilion microblade core showing flake scars, striking platform and fluted element.

Table 18. Microcore measurements.

Attribute	Measurement (mm)	
Height	33.8	
Thickness	17.1	
Weight	23.2	
Platform Length	37.6	
Platform Angle	72°	
Chord Length	17.4	
Microblade facet	Length	Width
1.	7	3.0
2.	17	3.0
3.	32	3.5
4.	33	2.9
5.	34	4.0
6.	33	5.0
7.	28	4.0
8.	32	4.6

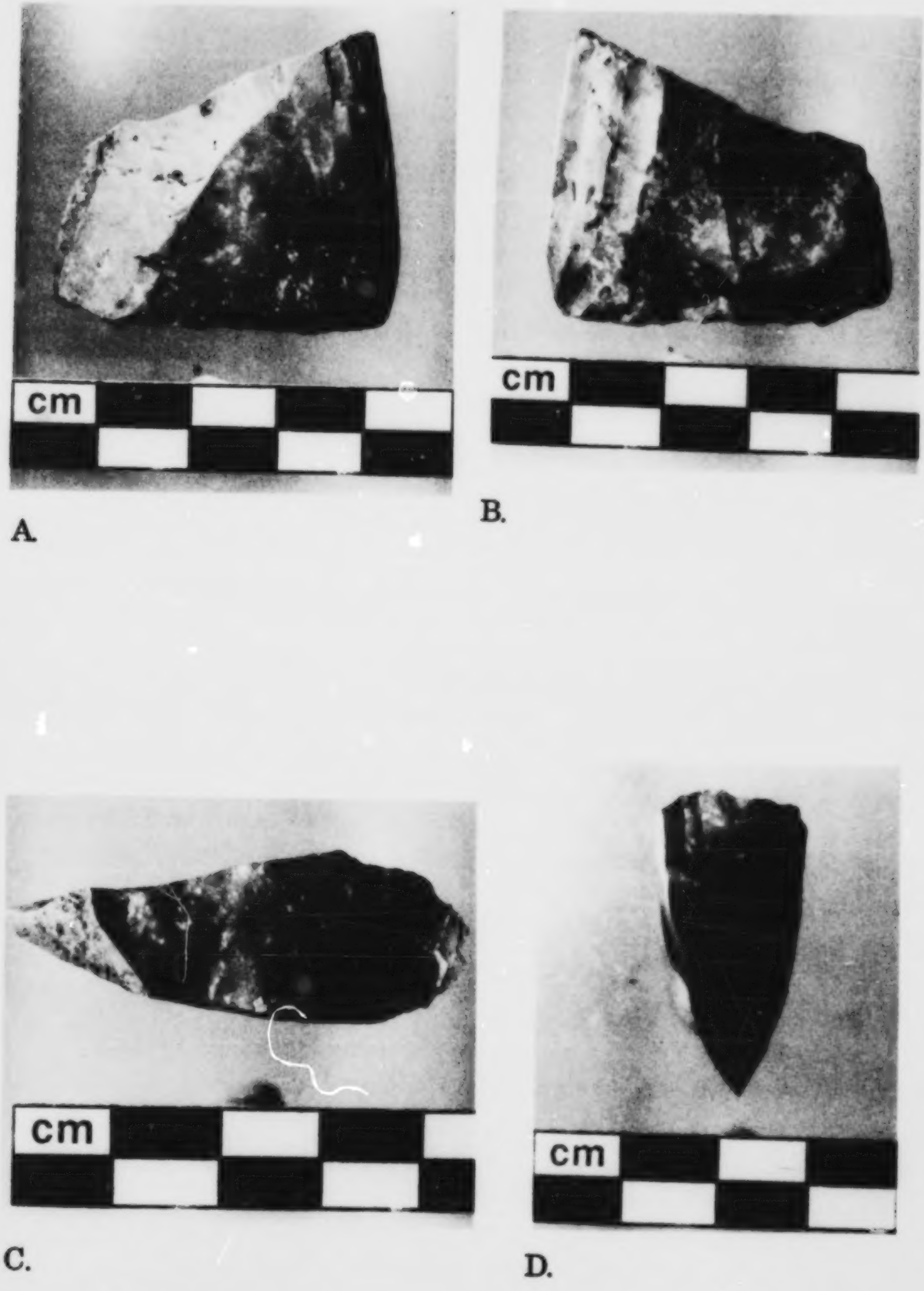

cm
A.
cm
B.
cm
C.
cm
D.

Figure 58 Photographs of Fort Vermilion microblade core.

core from this residue, assuming that it is contemporaneous to the artifact and has not been contaminated.

Flake scars are still evident on the obverse and reverse faces of the microcore. Flakes were removed from the base of the microcore and indicate that it was manufactured from a biface (Morlan 1970:31). The faces of the biface became the faces of the microcore. The face of the wedge element still contains some cortex. Thus, the manufacturing sequence of this microcore is similar to the F1 sequence initially described by Morlan (1970) for a sample of microcores from the Yukon and Alaska. These microcores were made by shaping first the lateral surfaces of the core, followed by the platform element, and then the fluted element.

The striking platform of the core was made by fracturing the biface with a blow on the edge of what was to become the fluted element. The platform forms a 72° angle to the fluted element edge. The flute chord is not precisely perpendicular to the longitudinal axis of the core (Figure 57). In the strict sense of the definition, this core is partly a tablet because the striking platform extends to the sides of the artifact, shifting the flute chord parallel to the longitudinal axis of the object. The microcore platform shows no signs of rejuvenation.

The fluted element has eight partial or complete microblade scar facets. The lengths of the facets vary considerably. A few run the entire length of the face of the fluted element (Table 18; Figures 57 and 58). The width of the facets is also variable, ranging from approximately 3 to 5 mm (Table 18).

DISCUSSION

Although the occurrences of microcores and blades are becoming relatively more common as areas of northern Alberta are investigated more frequently, they are still quite rare when compared to other artifact types and technologies. For example, in the Fort Vermilion region, 35 prehistoric sites have been documented (all with good surface visibility) and have produced evidence of only one microcore. While the numbers of microcores and blades are still small, it is evident from other finds in northern Alberta that this technology is present in the Athabasca River and

Peace River drainage systems (Fedirchuk 1982; Gruhn 1981; Heitzmann 1982; LeBlanc and Ives 1986; McCullough 1983; Stevenson 1981).

Comparison of the Fort Vermilion microcore to other specimens from northern Alberta and northwestern North America indicates that it is relatively large (Table 19). This may be because only a few blades have been removed, and therefore the core is far from exhausted. Furthermore, the core was not manufactured from a small pebble, as were many other recovered microcores. Comparison of this core to one found at the Strathcona site (FjPi-29) makes the Fort Vermilion core seem small (Pyszczyk 1985:48-51). The Strathcona microcore is approximately 29 mm high with a platform length of roughly 52 mm. It too was deposited in the initial stages of reduction, having had only three blades removed. It was manufactured from a large piece of petrified wood rather than a pebble. It is expected that, as a larger sample of microcores are found, the maximum size range will increase considerably.

To conclude, the occurrence of the microblade core at a large site like Gull Lake, which has been reoccupied frequently for several thousands of years, supports LeBlanc and Ives' (1986:85) belief that there are a higher frequency of microcores and blades at residential base camps than at "limited activity camps." The presence of microcores at the Strathcona and Peace Point sites (Stevenson 1981), which were also likely frequently occupied base camps, further supports this contention. However, whether this pattern is cultural or due to archaeological site formation processes remains debatable.

Table 19. Microcore measurement comparisons.

Location	Core Height (mm)	Platform Length (mm)	Chord Length (mm)	Thickness (mm)	Weight (g)
Ft. Vermilion	33.8	37.6	17.4	17.1	23.2
Bezya	26.2	21.7	7.8	9.7	7.0
	28.1	11.6	6.6	10.4	8.5
	32.4	24.8	-	12.0	9.7
	20.9	18.2	-	9.0	3.5
	29.5	20.6	-	11.6	11.6
Calling Lake 1	12.0	-	-	7.0	-
	21.0	-	-	16.0	-
	34.0	-	-	14.0	-
Calling Lake 2	24.1	-	-	11.2	-
S.W. Yukon	-	22.0	10.8	-	-
Lehman (B.C.)	-	25.3	17.7	-	-
Strathcona	29.0	52.0	20.5	19.8	29.4

Sources are Bezya (LeBlanc and Ives 1986:67), Calling Lake 1 (Gruhn 1981:33), Calling Lake 2 (Heitzmann 1982:14), S.W. Yukon and Lehman (British Columbia; from Morlan 1970:24).

NOTE: The measurements of the southwestern Yukon and Lehman cores are expressed as means.

ENVIRONMENT CANADA, CANADIAN PARKS SERVICE
ARCHAEOLOGY IN ALBERTA, 1988

By
William Perry, Daryl Fedje, Bruce Morton, Rod Pickard,
John Porter, Ian Sumpter and Don Steer
Archaeological Research Services Unit
Canadian Parks Service

INTRODUCTION

Directing a total of 129 projects in 1988, the Archaeological Research Services Unit of Western Regional Office undertook 72 projects within national parks and national historic parks and sites in Alberta. These projects included 56 archaeological resource impact assessments (ARIAs), eight archaeological resource monitoring projects, three site revisitation and assessment programs, one heritage site recording (contract), one archaeological resource impact assessment/mitigation program (contract) and two archaeological resource inventories (Table 20). A total of 63 new archaeological resource sites was recorded in Alberta by the Archaeological Research Services Unit in 1988. Brief summaries of the investigations and results of major projects conducted in 1988 follow.

Results of all projects will appear in either one or all of the following: in-house manuscripts, external publications, or one of Canadian Parks Service's publications. Access to or information about these reports can be obtained from the Archaeological Research Services Unit, Calgary.

COLLECTIONS AND SITE DATA MANAGEMENT - ALBERTA

Collections Management now has responsibility for approximately 2,000 archaeological sites in Alberta and British Columbia. The majority of the data input associated with these sites began in the latter part of 1988 with the arrival of a new Collections Manager, Bruce Morton. A contract to continue this data input and file organization and to incorporate the restructured information into the Canadian Parks Service electronic management records system has been instituted. The Regional Site Data

Co-ordinator, Kevin Montgomery, in addition to his continuing maintenance of computer-based site data files, is responsible for the development and implementation of a site information data base, RTFAAX, which is being successfully introduced into the Archaeological Research Services Unit, Western Region.

ARCHAEOLOGICAL RESOURCE DESCRIPTION PROGRAM ALBERTA'S NATIONAL PARKS

Work progressed in 1988 on the Western Region Archaeological Resource Description (Site Management) Program. Office activities focused on the completion of the Banff and Jasper Archaeological Resource Descriptions (site management plans). Field activities centred on resource inventory and assessment studies in Waterton Lakes National Park. The Waterton fieldwork was carried out by Rod Pickard with the assistance of Daryl Fedje and Kathy Neary between June 15 and September 30.

For the purpose of archaeological resource description, Waterton Lakes National Park was divided into nine management units and 17 watersheds (Figure 59). During the summer, 50 new sites were recorded, and 118 sites were revisited within these units. Most new prehistoric sites were found through shovel testing. Historical period sites were found through document review and informant interview. The Crypt Management Unit (4-7) was the only management unit not revisited over the course of the summer. The largest number of new sites were recorded in the Belly (n=13), Dunvargan (n=7), Waterton West (n=7), and the Waterton East (n=7) units. The largest number of revisitations were carried out in Waterton East (n=31), Waterton West (n=35) and the Blakiston (n=38) units. Other aspects of the program consisted of mapping the historical site of Oil City (1508R) and assessment of prehistoric sites 637R at the Dardanelles and 762R at Red Rock Canyon (Figure 60). Information collected during these latter studies will aid interpretation and long-term management. Three radiocarbon samples were submitted from site 637R to build upon existing interpretations for the site. A projectile point which compares favorably to Scottsbluff was collected from the lowermost level at site 762R at Red Rock. Preliminary field and post-field analysis stages would suggest that two distinct components exist at the base of site 762R.

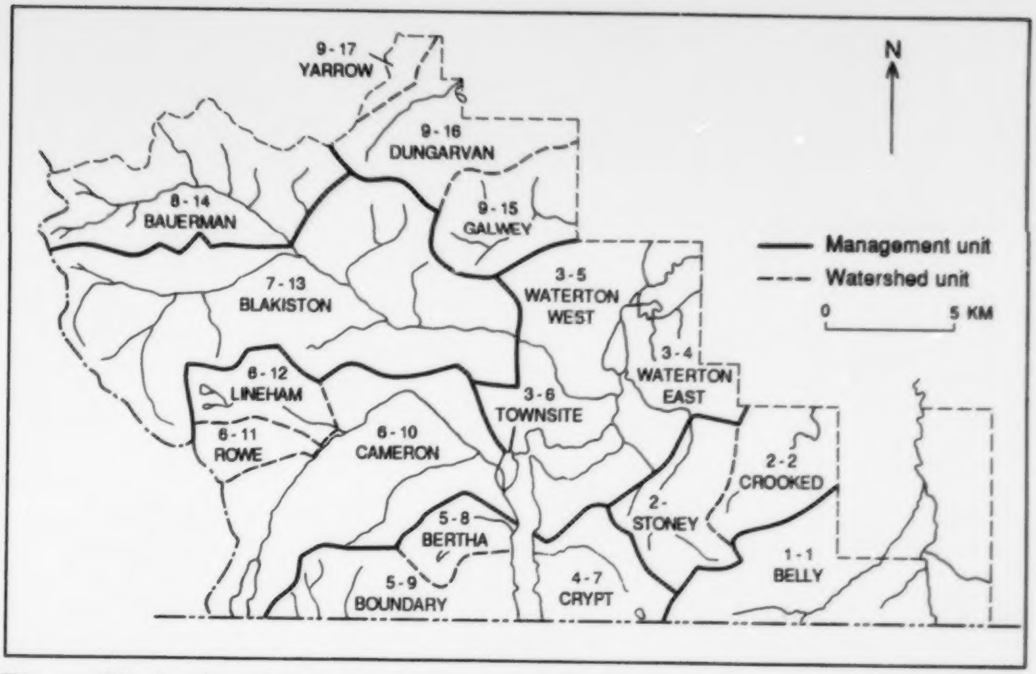

9 - 17
YARROW
N
9 - 16
DUNGARVAN
8 - 14
BAUERMAN
9 - 15
GALWEY
Management unit
Watershed unit
0
5 KM
7 - 13
BLAKISTON
3 - 5
WATERTON
WEST
3 - 4
WATERTON
EAST
6 - 12
LINEHAM
3 - 6
TOWNSITE
6 - 11
ROWE
6 - 10
CAMERON
2 - 2
CROOKED
2 -
STONEY
5 - 8
BERTHA
1 - 1
BELLY
5 - 9
BOUNDARY
4 - 7
CRYPT

Figure 59. Archaeological resource management units, Waterton Lakes National Park.

The earliest cultural horizon appeared to be associated with Scottsbluff and a cultural horizon located immediately above appeared associated with Lusk. During the coming fiscal year, radiocarbon dates were submitted to address the separation problem.

One of the more interesting discoveries of the inventory was the association of a number of stone features on high ridges and mountain tops. Although these features are difficult to assign in temporal and cultural terms, they most likely relate to ceremonial and other activities of the local native groups.

On a final note, the 1988 archaeological program provided numerous examples that natural processes such as lateral stream migration have resulted in loss of intact archaeological remains. In comparing channel positions noted on site drawings completed in the mid to late 1960s, it is clear that this is a serious management problem. In addition, two resource description activities were planned for the 1989/90 fiscal year: finalization of the Waterton Lakes National Park Archaeological Resource Description and initiating the Elk Island National Park Archaeological Resource Description.

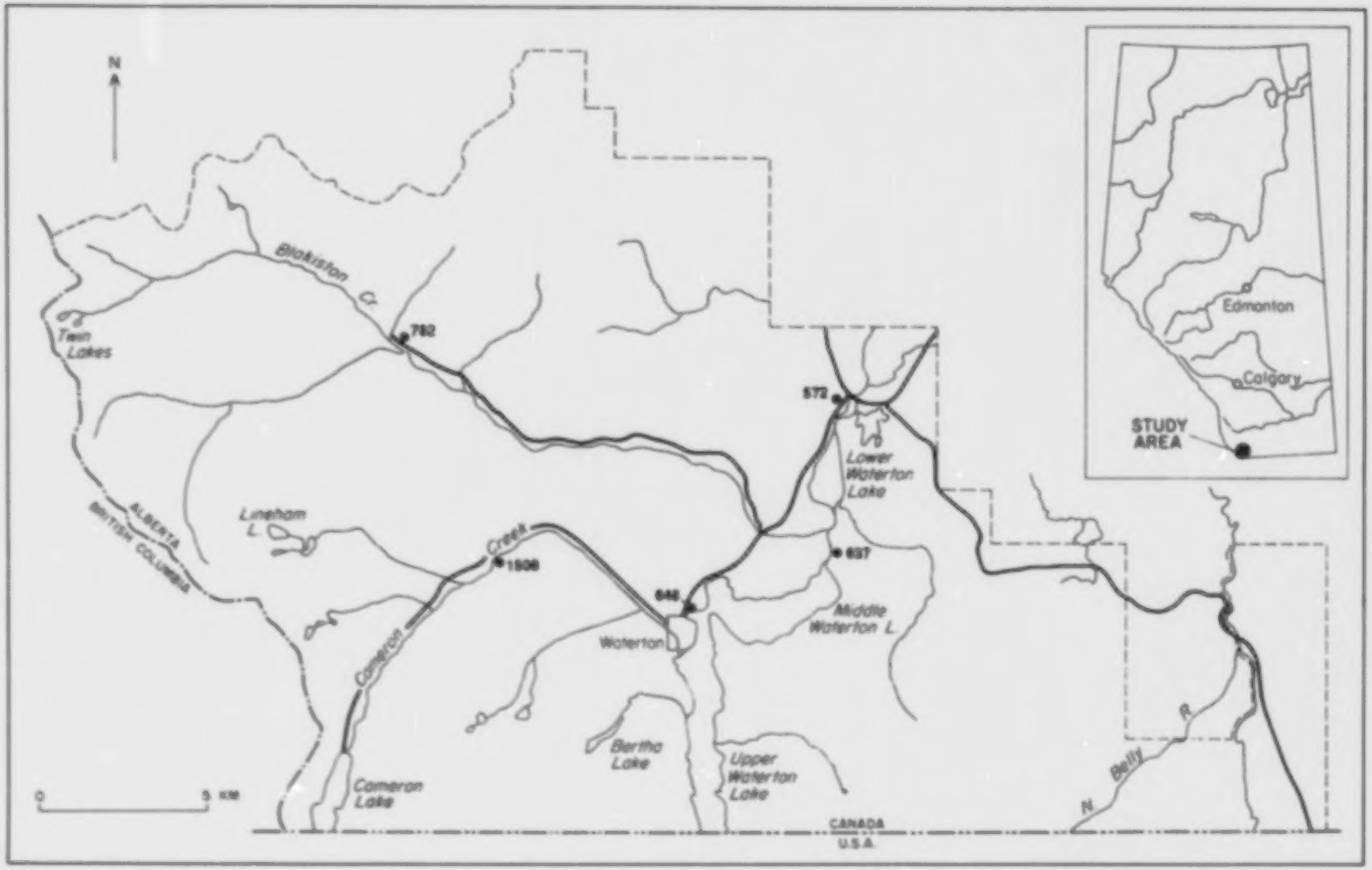

N
Blakiston Cr.
782
Twin Lakes
572
Lower Waterton Lake
Linehan L.
Creek
1506
637
646
Middle Waterton L.
Waterton
Cameron
Bertha Lake
Upper Waterton Lake
Cameron Lake
ALBERTA
BRITISH COLUMBIA
0
5 km
CANADA
U.S.A.
N. Belly R.
Edmonton
Calgary
STUDY AREA

Figure 60. Locations of assessed archaeological resource sites, Waterton Lakes National Park.

SALVAGE ARCHAEOLOGY PROGRAM IN ALBERTA'S NATIONAL PARKS

During the 1988 field season, the Archaeological Research Services Unit's salvage crew conducted 57 archaeological assessment/monitoring studies within four national parks in Alberta (Sumpter 1989). These included Banff (n=27), Elk Island (n=3), Jasper (n=21), and Waterton Lakes (n=6) national parks (Table 20, Figures 61, 62, 63, 64 and 65).

In general, the objectives of the Western Region's salvage archaeology program were fourfold:

(1) to assess proposed capital developments within the national parks with potential for conflict with archaeological resources;
(2) to locate and evaluate previously known and newly discovered archaeological sites relating to the impact assessment studies;
(3) to provide direction to planning and resource management for each archaeological site regarding mitigative measures; and
(4) to revisit designated resource sites to determine their significance values and monitor human and natural disturbance processes.

In total, 50 archaeological resources were identified.

In conjunction with the above, the Salvage Archaeologist, Ian Sumpter, oversaw and/or participated with the Salvage Research Assistant, Bill Perry, in five cost-recovery assessment projects. The other five projects were carried out in response to proposed highway improvements in Waterton Lakes (Swayze 1988) and Banff, the installation of communication cables in Jasper (Sumpter 1988) and Waterton Lakes (Perry and Sumpter 1988), and the burial of a powerline in Banff and Yoho (Perry 1988) national parks.

In 1988, a Site Revisitation and Reassessment component was incorporated into the Salvage Program. The latter study, in some cases a result of each park's Archaeological Resource Description (ARD) process, occurred in three of Alberta's four national parks. Through the employment of a computer assisted generation of monitoring schedules, the Site Revisitation and Reassessment program addresses resources lacking evaluative data required for cultural resource management.

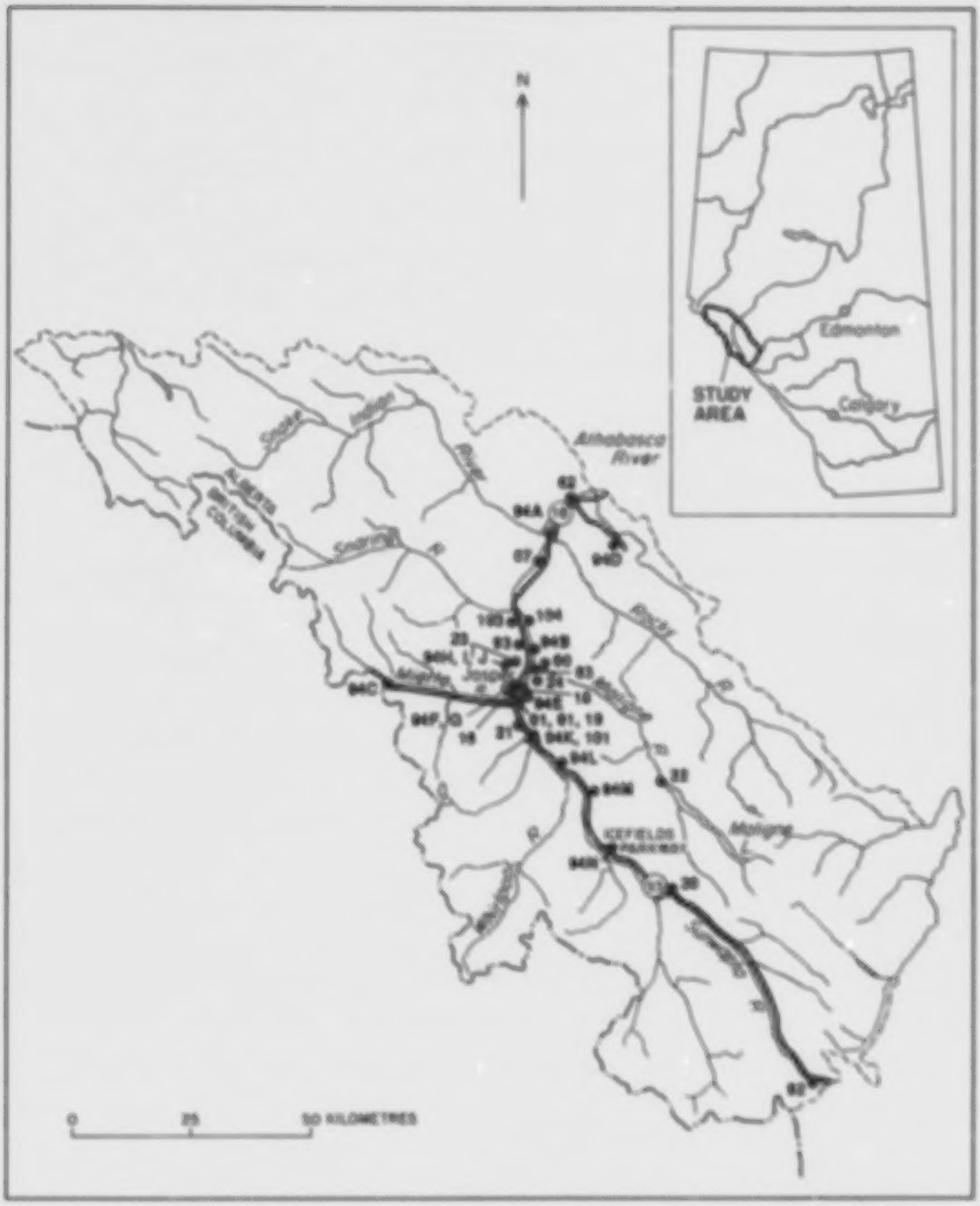

N
Edmonton
Calgary
STUDY AREA
Athabasca River
Snake Indian River
Smoky R.
ALBERTA
BRITISH COLUMBIA
Miette
Jasper
Maligne
Rocky R.
Whirlpool
Sunwapta
ICEFIELDS PARKWAY
62
94A
16
94D
97
103
104
23
93
94B
94H, I, J
90
94C
63
24
16
94E
94F, G
18
21
91, 81, 19
94K, 101
94L
33
94M
94N
20
93
0
25
50 KILOMETRES

Figure 61. Locations of assessed archaeological resources sites, Jasper National Park.

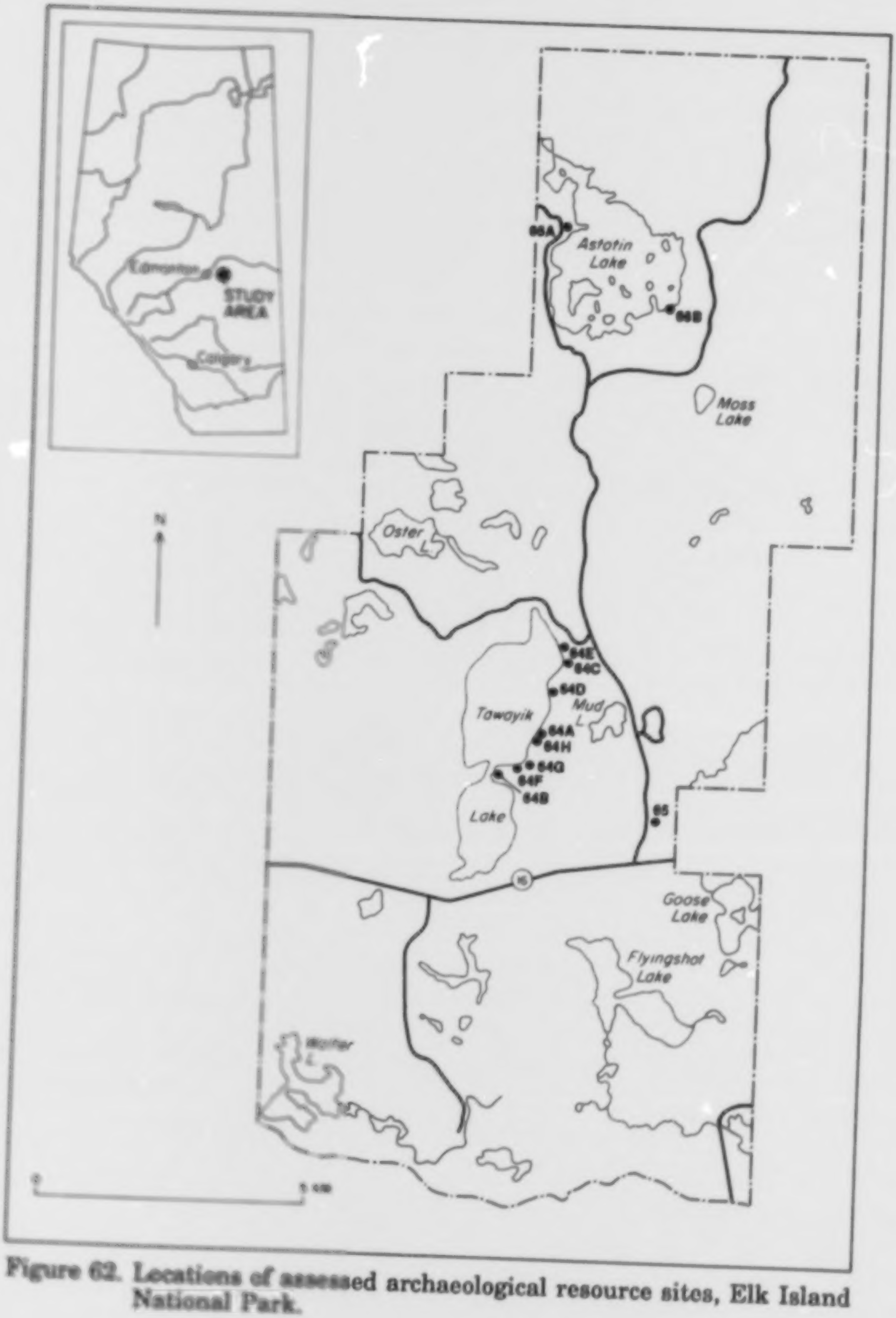

Edmonton
STUDY AREA
Calgary
N
0
66A
Astotin Lake
66B
Moss Lake
Oster L.
64E
64C
64D
Mud L.
Tawayik
64A
64H
64G
64F
64B
Lake
65
16
Goose Lake
Flyingshot Lake

Figure 62. Locations of assessed archaeological resource sites, Elk Island National Park.

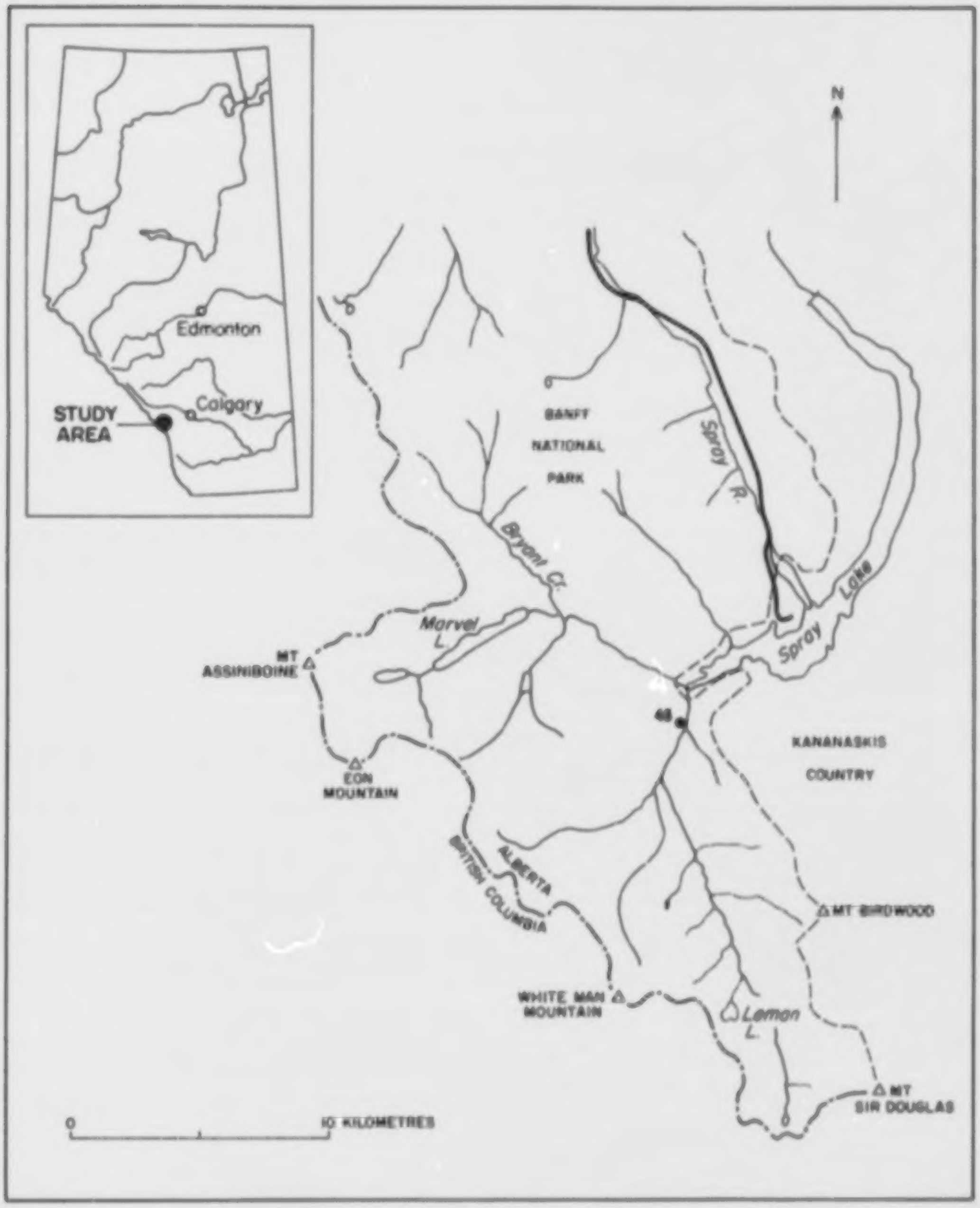

N
Edmonton
Calgary
STUDY AREA
BANFF NATIONAL PARK
Spray R.
Bryant Cr.
Marvel L.
Spray Lake
MT ASSINIBOINE
48
EON MOUNTAIN
KANANASKIS COUNTRY
ALBERTA
BRITISH COLUMBIA
MT BIRDWOOD
WHITE MAN MOUNTAIN
Lemon L.
MT SIR DOUGLAS
0
10 KILOMETRES

Figure 63. Locations of assessed archaeological resource sites, lower Banff National Park.

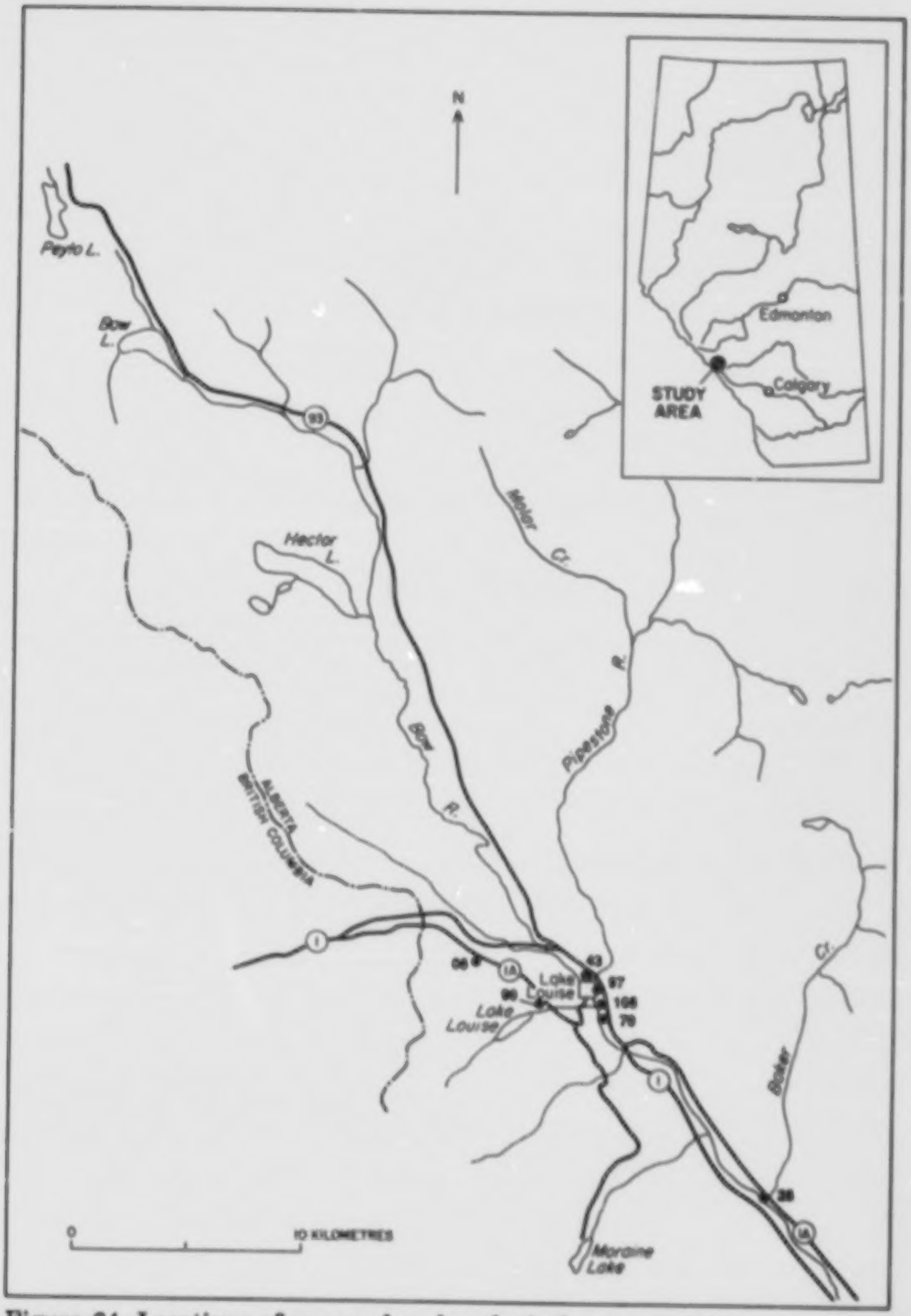
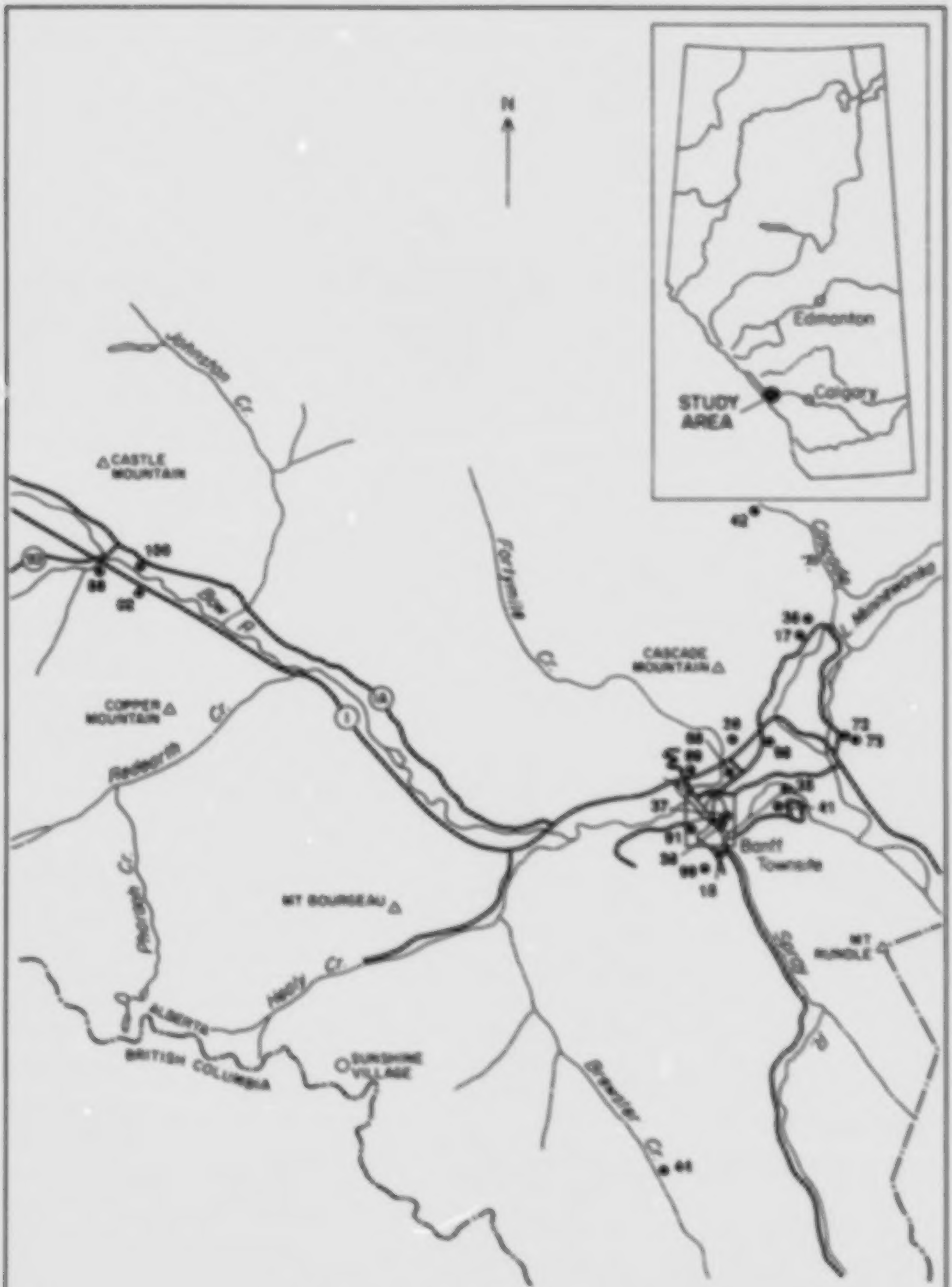

N
Peyto L.
Bow L.
93
Hector L.
Molar Cr.
Bow R.
Pipestone R.
ALBERTA
BRITISH COLUMBIA
1
1A
96
63
97
108
79
99
Lake Louise
Lake Louise
Baker Cr.
38
Moraine Lake
0
10 KILOMETRES
Edmonton
Calgary
STUDY AREA

Figure 64. Locations of assessed archaeological resource sites, upper Banff National Park.



N
Edmonton
Calgary
STUDY AREA
Johnston Cr.
CASTLE MOUNTAIN
100
98
92
Bow R.
Forty Mile Cr.
42
Cascade R.
36
17
Minnewanka
CASCADE MOUNTAIN
COPPER MOUNTAIN
Redearth Cr.
1
1A
39
88
90
73
73
37
33
41
91
38
99
16
Banff Townsite
MT BOURGEAU
MT RUNDLE
Spray R.
Pharaoh Cr.
Healy Cr.
ALBERTA
BRITISH COLUMBIA
SUNSHINE VILLAGE
Brewster Cr.
61
0
10 KILOMETRES

Figure 65. Locations of assessed archaeological resource sites, central Banff National Park.

ENTRANCE ROADS ARCHAEOLOGY, SITES 640R AND 572R MITIGATION WATERTON LAKES NATIONAL PARK

In the summer of 1988, Ken Swayze undertook test excavations at site 646R (Linnet Lake) and site 572R (Waterton River) in Waterton Lakes National Park (Figure 60). This in-house test program represents assessment toward mitigation of prehistoric sites threatened by proposed reconstruction of Highway 5 in Waterton Lakes National Park. Significant intact cultural deposits were identified at both sites, and mitigative excavations are proposed under contract for the 1989 field season. Cultural deposits at site 646R extend to ca. 8,000 years BP; however, only those cultural layers adjacent to and below the identified Mazama tephra layer appear to be undisturbed and non-contaminated. Cultural deposits at site 572R extend to Middle Prehistoric time and include at least, two stratified components with abundant material culture remains.

ARCHAEOLOGICAL ASSESSMENT FOR PROPOSED INSTALLATION OF WESTCOAST PETROLEUM LTD. WATER PIPELINE ROCKY MOUNTAIN HOUSE NATIONAL HISTORIC PARK

In November 1988, a preliminary archaeological assessment along a 15 m wide right-of-way for a proposed water pipeline was conducted (Figure 66). The proponent, Westcoast Petroleum Ltd., currently operates a gas processing plant within Rocky Mountain House National Historic Park and required the pipeline to supply water to the plant cooling system. Previous ground disturbance activities at the plant in 1969, 1971 and 1979 revealed a number of historical human internments associated with the Seafort Burial Site (Skinner 1972; Steer and Lutick 1980). These cultural remains are highly significant to the history of the national historic park, as well as sensitive in terms of being human remains.

The right-of-way traversed two distinct fluvial terraces deemed to exhibit moderate to high potential for archaeological resources. A number of tests (n=7) were excavated. but no cultural items were recovered (Figure 60). All soils encountered were fluvial clays, silts and sands. Examination of exposed erosional surfaces was carried out but with negative results.

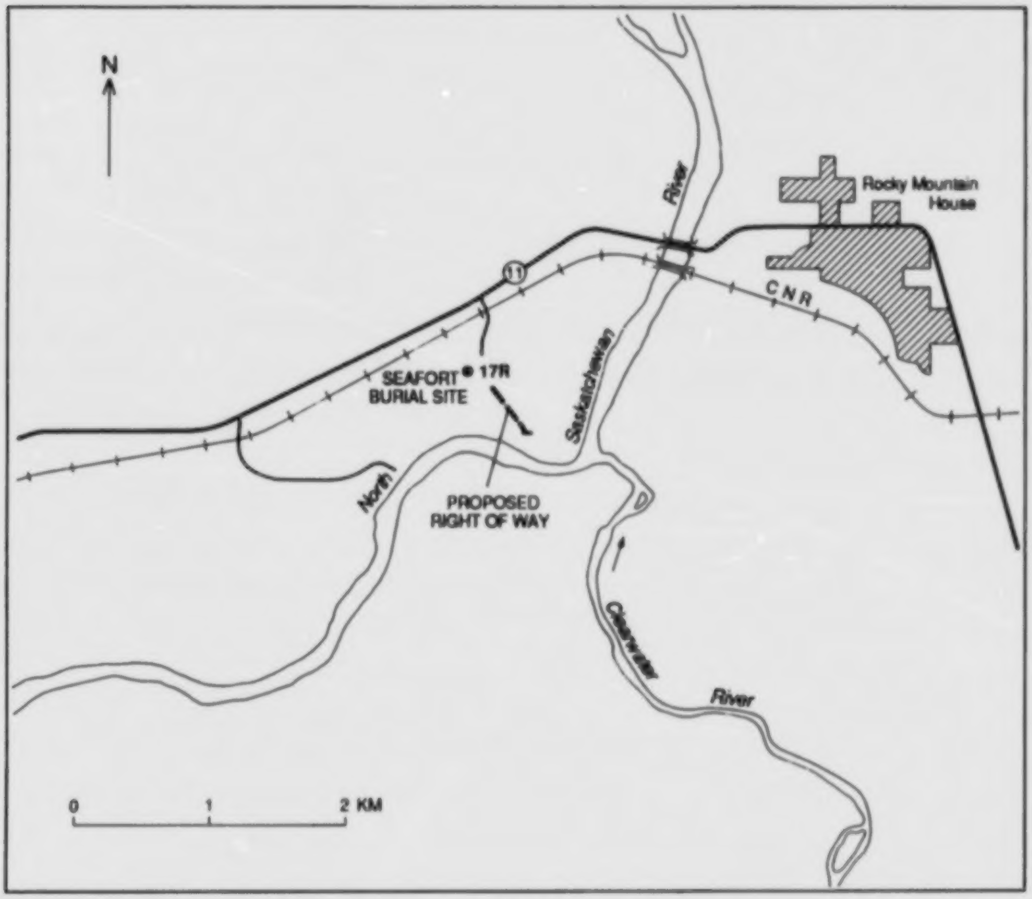

N
River
Rocky Mountain House
11
C N R
SEAFORT 17R
BURIAL SITE
Saskatchewan
North
PROPOSED RIGHT OF WAY
Clearwater
River
0
1
2 KM

Figure 66. Project location, Rocky Mountain House National Historic Park.

Due to the planned depth of the pipeline (2 m), monitoring of pipeline installation will be required to ensure that archaeological resources, if revealed, will be recorded and mitigated. A final project report will be prepared upon completion of pipeline installation.

Table 20. Projects conducted/implemented in Alberta by the Archaeological Research Services Unit, Canadian Parks Service, Western Region

PROJECT #	RESEARCHER	DESCRIPTION
WRA-88-01	Ian Sumpter	Alpine Village Expansion ARIA and monitoring, Jasper National Park
WRA-88-02	Ian Sumpter	DPW Trans-Canada Highway Archaeology ARIA and monitoring, Banff National Park
WRA-88-03	Contract	Columbia Icefield Redevelopment ARIA, Jasper National Park
WRA-88-04	Ken Swayze	Waterton Lakes Highway Archaeology, ARIA, Waterton Lakes National Park
WRA-88-06	Bill Perry	Synex Transmission Line Installation Lake Louise to Field ARIA, Banff and Yoho national parks
WRA-88-07	Ian Sumpter	Jasper AGT Cable Installation ARIA, Jasper National Park
WRA-88-13	Rod Pickard	Waterton Lakes Archaeological Resource Inventory, Waterton Lakes National Park
WRA-88-15	Ian Sumpter	Canadian Western Natural Gas Transmission Line - Spray R. Crossing ARIA, Banff National Park
WRA-88-16	Ian Sumpter	Jasper Townsite Development ARIA and monitoring, Jasper National Park
WRA-88-17	Ian Sumpter	Cascade Trailhead Outfitters, Facilities ARIA, Banff National Park
WRA-88-18	Ian Sumpter	Pine Bungalows Development ARIA, Jasper National Park
WRA-88-19	Ian Sumpter	AGT Buried Cable - Jasper Townsite Woodyard ARIA, Jasper National Park
WRA-88-20	Ian Sumpter	Sunwapta Falls Bungalows Development ARIA, Jasper National Park

Table 20. continued

PROJECT #	RESEARCHER	DESCRIPTION
WRA-88-21	Ian Sumpter	Becker's Bungalows Development ARIA, Jasper National Park
WRA-88-22	Ian Sumpter	Maligne Lake Horse Concession ARIA, Jasper National Park
WRA-88-23	Ian Sumpter	CNCP Telecom Road Improvements ARIA, Jasper National Park
WRA-88-24	Ian Sumpter	Lake Edith Sewage Field Installation ARIA, Jasper National Park
WRA-88-25	Ian Sumpter	Baker Creek Chalets Redevelopment ARIA, Banff National Park
WRA-88-29	Bill Perry/ Ian Sumpter	Waterton Lakes AGT Cable Installation ARIA, Waterton Lakes National Park
WRA-88-33	Daryl Fedje	Banff Archaeological Resource Description, Western Region Office
WRA-88-35	Ian Sumpter	Rocky Mountain Tours Boat Launch ARIA, Banff National Park
WRA-88-36	Ian Sumpter	Cascade Fireroad Rehab. ARIA, Banff National Park
WRA-88-37	Ian Sumpter	Banff Centre Development ARIA, Banff National Park
WRA-88-38	Ian Sumpter	Fenland Trail Bridge Construction ARIA, Banff National Park
WRA-88-39	Ian Sumpter	Bison Paddock Modifications ARIA, Banff National Park
WRA-88-41	Bill Perry	Banff Townsite Sewage Lagoon/Treatment Plant ARIA, Banff National Park
WRA-88-42	Bill Perry	Flints Park Campground ARIA, Banff National Park

Table 20. continued

PROJECT #	RESEARCHER	DESCRIPTION
WRA-88-43	Bill Perry	Lake Louise Inn Development ARIA, Banff National Park
WRA-88-44	Bill Perry	Brewster Warden Cabin Construction ARIA, Banff National Park
WRA-88-45	Bill Perry	Palliser Trail Reroute ARIA, Banff National Park
WRA-88-51	Don Steer	Temporary Privy Construction Monitoring, Rocky Mountain House National Historic Park
WRA-88-52	Don Steer	Buffer Zone Tree Planting Monitoring, Rocky Mountain House National Historic Park
WRA-88-56	Contract	Tonquin Trail Archaeological Impact Assess./Mitigation, Jasper National Park
WRA-88-60	Bill Perry	Maligne Canyon Teahouse Sewage Tank Installation ARIA, Jasper National Park
WRA-88-61	Bill Perry	Jasper House Bungalows Expansion ARIA, Jasper National Park
WRA-88-62	Bill Perry	Pocohontas Warden Stn. Electrical Cable Installation ARIA, Jasper National Park
WRA-88-63	Bill Perry	Weather Station Construction ARIA, Jasper National Park
WRA-88-64	Ian Sumpter	Archaeological Site Revisitation and Assessment, Elk Island National Park
WRA-88-65	Ian Sumpter	Corral and Holding Facility Construction ARIA, Elk Island National Park
WRA-88-66	Ian Sumpter	Irrigation Pumping Plant Rehabilitation ARIA, Elk Island National Park
WRA-88-68	Ian Sumpter	AGT CAble Installation ARIA, Banff National Park

Table 20. continued

PROJECT #	RESEARCHER	DESCRIPTION
WRA-88-69	Ian Sumpter	TransAlta Access Improvements ARIA, Banff National Park
WRA-88-70	Ian Sumpter	CPR Staff Housing Lake Louise Monitoring, Banff National Park
WRA-88-72	Ian Sumpter	Johnson Lake Dam Redevelopment ARIA, Banff National Park
WRA-88-73	Ian Sumpter	Johnson Lake Trail Improvements ARIA, Banff National Park
WRA-88-78	Bill Perry	Entrance Information Signage Installation ARIA, Waterton Lakes National Park
WRA-88-79	Bill Perry	Belly River Campground Tree Planting ARIA, Waterton Lakes National Park
WRA-88-80	Bill Perry	Red Rock Canyon Nature Trail Fencing Improvements ARIA, Waterton Lakes National Park
WRA-88-81	J. Svencicki	Western Region 1988 Artifact Conservation Programme, Western Region Office
WRA-88-83	Bill Perry	Archaeological monitoring of Trans-Alta Utilities Gauge Installation, Rocky Mountain House National Historic Park
WRA-88-85	Contract	Heritage Recording - Oil City, Waterton Lakes National Park
WRA-88-87	Bill Perry	Chief Mountain Customs Sewage Improvements ARIA, Waterton Lakes National Park
WRA-88-88	Ian Sumpter	Castle Workcamp Renovation ARIA, Banff National Park
WRA-88-89	Ian Sumpter	Archaeological Site Revisitation/ Assessment, Banff National Park

Table 20. continued

PROJECT #	RESEARCHER	DESCRIPTION
WRA-88-90	Ian Sumpter	Timberline Tours/Brewster Horse Trail Construction ARIA, Banff National Park
WRA-88-91	Ian Sumpter	Park Avenue Housing ARIA, Banff National Park
WRA-88-92	Ian Sumpter	Buried Powerline - Brewster Staff Camp ARIA, Jasper National Park
WRA-88-93	Ian Sumpter	Snaring Road Improvements ARIA, Jasper National Park
WRA-88-94	Ian Sumpter	Privy Site Relocations ARIA, Jasper National Park
WRA-88-97	Ian Sumpter	Visitor Reception Centre Construction Monitoring, Banff National Park
WRA-88-98	Ian Sumpter	Banff Rocky Mountain Resort Development ARIA, Banff National Park
WRA-88-99	Ian Sumpter	Sulpher Mountain Weather Station ARIA, Banff National Park
WRA-88-100	Ian Sumpter	Silver City Borrow Pit Rehabilitation ARIA, Banff National Park
WRA-88-101	Bill Perry	Marmot Borrow Pit Expansion ARIA, Jasper National Park
WRA-88-102	Ian Sumpter	Archaeological Site Revisitation and Assessment, Jasper National Park
WRA-88-103	Ian Sumpter	Post-Prescribed Burning Program Monitoring, Jasper National Park
WRA-88-104	Ian Sumpter	Fire Management Program ARIA, Jasper National Park
WRA-88-105	Ian Sumpter	Lake Louise CPR Overpass Construction Monitoring, Banff National Park

Table 20. continued

PROJECT #	RESEARCHER	DESCRIPTION
WRA-88-106	Contract	Pocahontas Manuscript - Report Production, Western Region Office
WRA-88-107	Contract	Cataloguing, Analysis and Information Transfer Archaeological Resource Description Programme
WRA-88-111	Bill Perry	Lone Lake Patrol Cabin Replacement ARIA, Waterton Lakes National Park
WRA-88-112	Bill Perry	Tamarack Trail Reroute ARIA, Waterton Lakes National Park
WRA-88-113	Jack Porter	Westcoast Petroleum Water Pipeline Installation Assessment/Monitoring, Rocky Mountain House National Historic Park
WRA-88-114	Contract	Western Region Office Soil Sample Processing
WRA-88-115	Jack Porter	Survey and Assessment of Northeast Field - ARIA, Rocky Mountain House National Historic Park
WRA-88-116	Ian Sumpter	Prince of Wales Hotel Toxic Waste Area Rehabilitation Monitoring, Waterton Lakes National Park
WRA-88-121	Contract	Western Region Radiocarbon Dating
WRA-88-123	Contract	Editorial Review - Banff, Kootenay, and Jasper Archaeological Resource Descriptions
WRA-88-124	Contract	Western Region Office Archaeological Collections Management
WRA-88-126	Contract	Elk Island/Waterton Lakes Archaeological Site Data Conversion
WRA-88-127	Contract	Historical Background Summaries, Banff National Park

ENVIRONMENT CANADA, CANADIAN PARKS SERVICE
ARCHAEOLOGY IN ALBERTA, 1989

By

Rod Pickard and Ian Sumpter
Canadian Parks Service

INTRODUCTION

The Archaeological Research Services Unit of the Western Regional Office conducted 68 projects within national parks and national historic parks and sites in Alberta (Table 21). These projects largely consisted of small-scale archaeological resource impact assessments (ARIAs) within Banff and Jasper national parks (n=4). More significant projects included the Waterton Lakes Entrance Road project, the Waterton Lakes Archaeological Resource Description and Analysis, and the Elk Island Archaeological Inventory.

Results of all projects will appear in at least one of the following: in-house manuscripts, external publications, or one of Canadian Parks Service's publications. Access to or information about these reports can be obtained from the Archaeological Research Services Unit in Calgary.

COLLECTION AND SITE DATA MANAGEMENT

New initiatives in the collection management area included the organization of artifact storage and assemblage of reference collection specimens. These were accomplished by a summer student. A contract was also carried out to catalogue, file and organize archaeological records and related documentation.

ARCHAEOLOGICAL RESOURCE DESCRIPTIONS AND ANALYSIS PROGRAM

Research efforts were directed towards completing the Elk Island Archaeological Resource Inventory and the Waterton Lakes National Park Archaeological Resource Description and Analysis. A contract was established to synthesize archaeological information for the Waterton Lakes National Park Management Plan.

EARP ARCHAEOLOGY

A number of archaeological resource overviews, impact assessments, and monitoring studies (n=61) were conducted in Banff, Elk Island, Jasper and Waterton Lakes national parks and in Rocky Mountain National Historic Park (Sumpter 1990). The objective of the EARP (Federal Environmental Assessment Review Process) archaeology program was twofold: to carry out exploratory and evaluative studies in response to proposed development and to acquire evaluative site data for cultural resource management purposes.

In Banff National Park, the program encompassed 37 archaeological resource assessment studies. Development-related projects (n=36) varied in scale and included highway, road and trail improvements, park and private facility construction and expansion, installation of water and sewer lines, prescribed fire burns, and the demolition of historical structures. The park's cultural resource management study involved the collection of evaluative data from two archaeological sites. In total, 14 cultural resources (five prehistoric, nine historical period) were identified in association with 10 of the 37 projects examined. Three of the 14 sites were unknown previously.

In Elk Island National Park, four archaeological resource impact assessments were conducted over a one week field period. The four studies involved the assessment of three proposed terrain altering developments and an archaeological site revisitation and assessment project. Seven known cultural resources were investigated; six of these were associated with the latter cultural resource management related program.

In 1989, a total of 12 archaeology related studies was undertaken in Jasper National Park under the support of the park's EARP archaeology program. Ten of the 12 projects were development-affiliated and included five utility line installations, three commercial/park facility improvements, and back country and trail improvements. Furthermore, the park's program involved the supervision and administration of an archaeological mitigation contract, as well as a cultural resource management study.

Five cultural resources were examined in association with three of the 11 in-house assessment projects. Four of the five resources were documented previously.

At Rocky Mountain House National Historic Park, three archaeological assessment projects were conducted (two in-house and one contract). The three projects included the archaeological monitoring of a pipeline installation, an overview study of an area identified for tree planting, and the revisitation and assessment of a known historical site for the purpose of monitoring river erosion. Two of the three projects yielded archaeological concerns.

Finally, in Waterton Lakes National Park, researchers were involved in six assessment studies. These six projects consisted of installation of water wells at three locales, realignment of an existing overhead transmission line, highway construction, installation of utilities at a new kiosk site, proposed excavation of a private well, and an annual cultural resource management program. Five of the six projects raised heritage concerns. In total, seven known cultural resources were examined.

ELK ISLAND ARCHAEOLOGICAL RESOURCE INVENTORY

INTRODUCTION

In 1989, the Archaeological Research Services Unit initiated a project to update the Elk Island inventory (Pickard and Swayze 1990). The inventory was carried out during an eight week period from August to October, 1989. Fifty-two new prehistoric sites and five new historical sites were discovered. Three specific objectives were developed: to examine landforms associated with smaller ponds and lakes not examined previously, to examine well-drained, sandy uplands selectively, and to record significant historical period sites.

ENVIRONMENTAL STUDY

Elk Island National Park takes in approximately 148 km of the Beaver Hills. The park is situated approximately 40 km east of Edmonton within the Boreal Aspen Forest Region (Rowe 1972). Characteristic topography consists of glacial till knolls and ridges interspersed with shallow lakes and mounds. The highest elevation is 760 m above mean sea level, although most of the terrain lies between 710 and 740 m. In general, the drainage pattern is "confused," and many streams are intermittent. Two systems drain out of the park, one from Walter Lake to Blackfoot Lake and another from Astotin Lake to the North Saskatchewan River. Surficial deposits consist of glaciolacustrine sediments, kame deposits and till.

PREVIOUS STUDIES

The initial resource inventory of the park was conducted under contract by ARESCO Ltd. in 1977 (Wilson and Head 1978). Survey focused on lake areas considered to have high potential, such as Astotin, Twayik, Walter and Oster lakes and the east-west drainage system connecting Walter and Blackfoot lakes. Survey areas also included medium potential areas, such as Flying Shot, Jordan, Mud, Spruce Island, Oxbow, Paul and Adamson lakes. A total of 158 prehistoric and eight historical sites was discovered. In 1984, the Archaeological Research Services Unit initiated the Western Region salvage program, Since 1984, 44 small-scale archaeological resource impact assessments have been completed.

1989 SURVEY

For the 1989 survey, Elk Island National Park was divided into three archaeological resource management units and six watershed units (Figure 67). Management and watershed units are geographically defined subdivisions of a national park established for the purpose of research planning, resource description, interpretation and management.

MANAGEMENT UNIT DESCRIPTIONS

Management Unit 1 is composed of the northwest and northeast watersheds. The management unit encompasses approximately 34 sq. km and is the smallest unit in the park. The northwest watershed is 21 sq. km, and the northeast watershed is 13 sq. km.

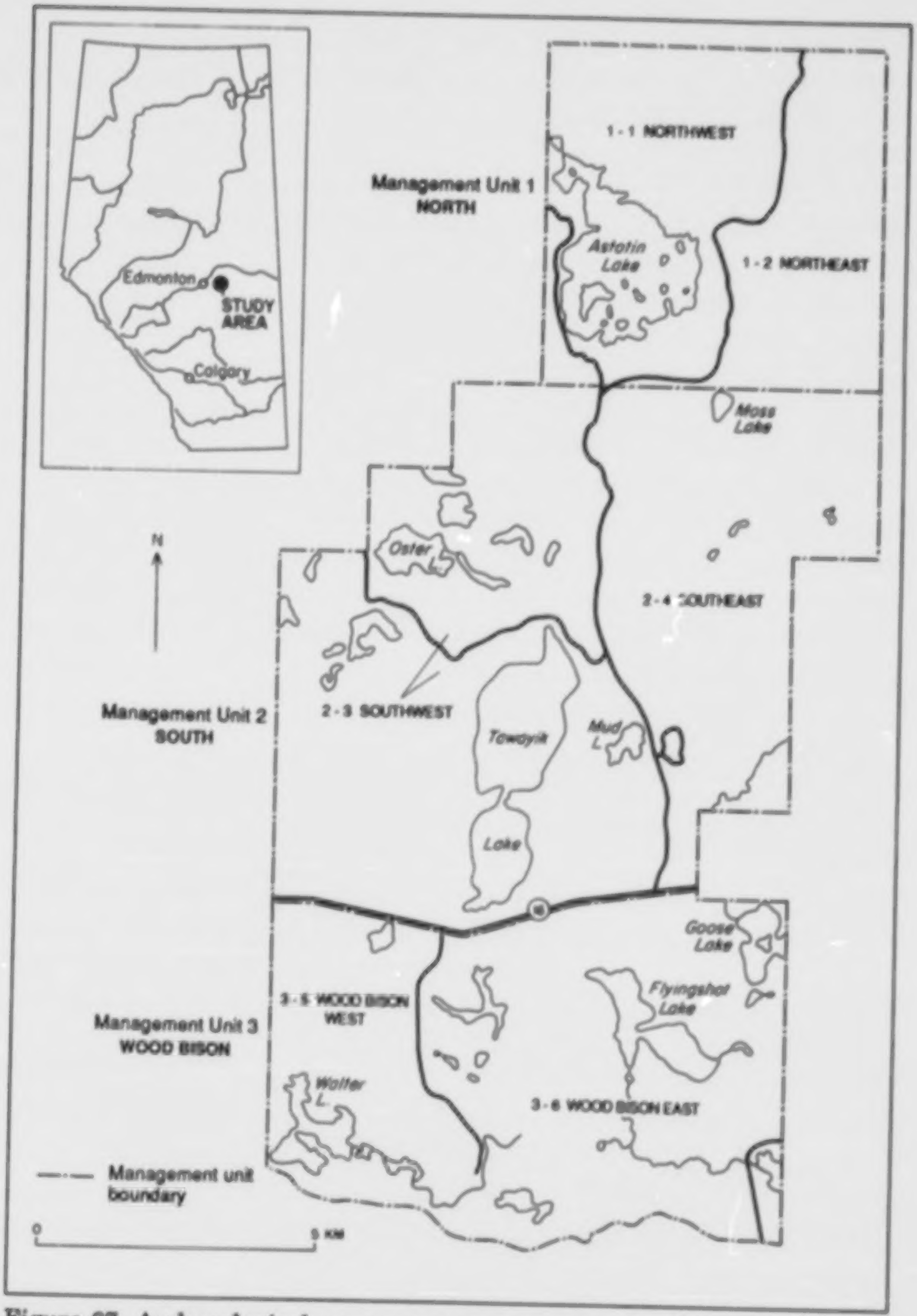

Edmonton
STUDY AREA
Calgary
1-1 NORTHWEST
Management Unit 1
NORTH
Astotin Lake
1-2 NORTHEAST
Moss Lake
Oster L.
N
2-4 SOUTHEAST
Management Unit 2
SOUTH
2-3 SOUTHWEST
Tawayik
Lake
Mud L.
Goose Lake
Flyingshot Lake
3-5 WOOD BISON WEST
Management Unit 3
WOOD BISON
Walter L.
3-6 WOOD BISON EAST
Management unit boundary
0
5 KM

Figure 67. Archaeological resource management units, Elk Island National Park.

This unit corresponds to the original enclosure that was set aside as an elk park. The unit is located in the north part of the park and is circumscribed on three sides by the west, north and east boundaries. The southern boundary of the unit was the original southern boundary of the park (from 1899 to 1913); it is located at latitude 53°39'30". The main park road, the Parkway, divides the unit into the northwest and northeast watersheds.

Astotin Lake, the largest body of water in the park, dominates the management unit, but there are numerous small ponds dotting the terrain in a random pattern. Astotin Creek, the only stream in the park to drain directly into the North Saskatchewan River, is in the extreme northwest corner of the unit.

Management Unit 2 is approximately 72 sq. km in size and is the largest unit in the park. It occupies the central portion of the park, north of the Yellowhead Highway. It is divided by the Parkway into two watersheds, the Southwest and the Southeast. The southwest watershed is 45 sq. km and is dominated by Tawayik and Little Tawayik lakes. In addition, there are several other large lakes (Oster, Paul and Shirley) and many small ponds. The southeast watershed is 27 sq. km; although it has no large bodies of water, there are numerous small ponds and a central north-south oriented meltwater channel.

Management Unit 3 corresponds to the block of land acquired from the Cooking Lake Forest Reserve in 1947 for use as a quarantine area to prevent the spread of contagious disease among the park's bison. This management unit is located south of Highway 16. Since the 1960s, this land has been used to separate wood bison from plains bison. This unit is approximately 42 sq. km and is divided into two watersheds by the north-south park road which leads to the southern warden residence. The Wood Bison west watershed is 12 sq. km and has only two medium-sized bodies of water: Walter Lake, located in the southwest corner, and an unnamed lake in the northeast corner. The Wood Bison east watershed, which is 30 sq. km, is characterized by several fairly large lakes: Flying Shot Lake, Blackfoot Lake, Goose Lake and the Bailey Lakes. In addition, there are numerous small ponds in both watersheds and an east-west drainage system occupying a meltwater channel.

PROCEDURE

The first two weeks of the eight week survey were spent in the Wood Bison unit and the remainder of the period was divided between the north and south units. The target areas for each day's survey were selected by studying ARESCO's map of their investigated areas (Wilson and Head 1978:65) and choosing areas they had not visited. The target for a day was usually a lake shore, stream or series of ponds.

The survey design was a combination of visual inspection of surface exposures and shovel testing. All exposed surface areas encountered within the target areas (e.g., bison wallows, road cuts, trails and shorelines) were inspected visually. Shovel testing was both systematic and judgmental, primarily the latter. Systematic tests (at regular intervals along a transect) usually were employed along level shorelines where no attractive landforms were apparent. Judgmental tests were made on landforms deemed to have good site discovery potential. Factors influencing this assessment included local topography (i.e., flat areas or areas possessing good look-out potential), proximity to water and soil drainage. Shovel tests were 50 x 50 cm and usually were excavated to the base of the Bt horizon, approximately 20-30 cm below the surface. (Most sites were assessed by at least three test pits.) Occasionally, however, tests were excavated deeper. Back dirt was screened through a 6 mm mesh hand screen to ensure recovery of small artifacts.

RESULTS

A total of 52 new prehistoric sites and five historical sites was discovered. Twenty-one prehistoric sites and three historical sites were found in the northwest unit of Management Unit 1 (Figure 67). One historical site was located in the northeast unit of Management Unit 1. Sixteen prehistoric sites were found in the southwest unit of Management Unit 2. One prehistoric site was located in the southeast unit of Management Unit 2. Management Unit 3 produced 14 prehistoric sites and one historical site. Three prehistoric sites were recorded in the west unit; the remainder of the sites were found in the east unit.

Prehistoric Sites

The most common site type was limited activity (n=40, 76.7%). These sites contained few artifacts and artifact types. Twenty sites of this type can be described as lithic scatters (producing only debitage); 16 are isolated finds (a single artifact); and four sites produced only bone. Fire-broken rock or evidence that the bones had been burned were used as cultural site indicators in the latter case. The remaining 12 sites are termed multiple activity loci (campsites) which have sufficient artifact diversity to suggest residential occupation.

With the exception of site 614R, all the sites found during the survey had compressed stratigraphy. Because most of the sites were buried shallowly, many artifacts were recovered within bison wallows. The majority of the sites (n=47, 89.5%) were considered to have a low degree of vulnerability, but four sites (473R, 474R, 614R and 1578R) were moderately vulnerable.

Historical Sites

Five historical sites were located in this survey. These sites relate to the operation of the park or its predecessor, the Cooking Lake Forest Reserve.

DISCUSSION AND MANAGEMENT CONCERNS

The 1989 inventory project demonstrated that there is excellent site discovery potential in Elk Island, even in areas already investigated (e.g., the Astotin Lake shoreline). The sites in the park are characteristically small and have few artifacts, suggesting single, short-duration occupations. Because of their size, the "typical" Elk Island site is difficult to locate and assess. Although small and of limited yield, the Elk Island sites are relatively undisturbed. Generally, they have been protected from agricultural activities, first by the Cooking Lake Forest Reserve and subsequently by the Canadian Parks Service. Their undisturbed condition greatly increases their regional significance.

Most Elk Island sites are buried shallowly. Typically, artifacts are found 5-20 cm below the surface at the interface between the A and B soil horizon. As a result, the sites are easily disturbed, even by relatively low impact activities, such as hiking trails and bison wallows. Over half of the sites in Elk Island National Park have been affected to some degree by bison wallows. Although this is unavoidable and results in relatively minor disturbance in most cases, the effect will increase with time and some sites eventually will be disturbed seriously (e.g., site 521R, FjPf-7, Tawayik Narrows).

The entire artifact collection from the 1989 survey is remarkably small. Only 187 items were recovered, including 50 bone fragments, two pottery sherds and a sherd of historical china. The most common raw material by far (n=100) was quartzite. The raw material was gathered locally in cobble form from glacial till and beaches of areas like Astotin Lake. The primary stone working technique in Elk Island appears to have been a split quartzite cobble industry. Large quartzite cobble tools were relatively common (n=10). These included cores (which may also have functioned as choppers), spall scrapers and hammerstones. Classic bipolar flakes and cores (distinguished by wedge shape, crushing and step fractures at both poles) were rare. Modified and utilized flakes (n=4) were rare as well, suggesting that many tasks were accomplished with unmodified flakes selected fortuitously from the "shatter" debitage. Fifteen flakes clearly show bifacial lithic reduction techniques. Only six projectile point fragments were recovered; none was complete. The diagnostic aspects of these tools (small triangular, side and corner notching) suggest that they relate to the Lake Prehistoric Period (Prairie Side-notched) and Middle Prehistoric Period (Pelican Lake).

Generally, site are concentrated along the shores of Astotin and Tawayik lakes. Available data suggest that native groups preferred the lake areas for several reasons, including the availability of lithic raw materials (quartzite), the presence of suitable landforms for habitation, and a concentration of food resources; however, the present pattern may be, in part, a result of the judgmental design of the two inventories and the association of ARIAs with large bodies of water. Many areas of Elk Island National Park have not been surveyed and many potential site locations would be very difficult to test properly. It is necessary to keep in mind that the Beaver Hills likely were occupied year round and that they may have been particularly attractive in the winter months because bison sought shelter from the winter storms there. The low lying, gleysolic depressions that are inaccessible in the warmer months may have been attractive locations for campsites in winter months. Indeed, in terms of winter fuel and shelter, the spruce bogs would have made ideal campsites. Furthermore, since palynological evidence indicates that the small ponds in Elk Island were dry prior to 4,000 years BP (Vance 1979; Vance et al. 1983), the ponds basins themselves may have been habitable in the winter months. If these were the favoured types of locations then the sites are virtually invisible and unavailable for contemporary study. If this is the case, then the extant site pattern relates to warm weather occupation of the park. Although the small lakes and ponds were dry prior to 4,000 years BP, it is not clear if the larger lakes (Astotin and Tawayik) dried up completely. Certainly they would have been much smaller than at present, and any Early Prehistoric and early Middle Prehistoric sites on their shores are completely inundated now.

Wilson and Head (1978) proposed that more sites would be located on streams flowing directly to the North Saskatchewan River than on other less directly flowing streams. It was assumed that the North Saskatchewan River and its environs were a focal area of prehistoric occupation and that the Beaver Hills were a hinterland. This hypothesis was not supported by the evidence, however, for many more sites than anticipated were found on streams that did not flow directly to the North Saskatchewan River. Wilson and Head (1978) revised this settlement pattern hypothesis and suggested that the park area was itself a focus for a variety of prehistoric activities. It should be pointed out that there has been no survey of similar scope and intensity along the river plain, and in the absence of comparable data, this conclusion may be premature. Furthermore, there is only one short stream in the park that flows directly to the North Saskatchewan River (Astotin Creek). Based on the 1989 findings, it appears that the Elk Island sites reflect the settlement-subsistence activities of small, mobile groups of people who relied on a variety of dispersed plant and animal resources. This pattern could have remained unchanged over the millenia, thus explaining the sparse nature of the archaeological resource base.

Table 21. 1989 Alberta project list, Archaeological Research Services Unit, Canadian Parks Service, Western Region.

PROJECT #	DESCRIPTION
WRA-89-04	Jasper Park Lodge Development Preliminary ARIA
WRA-89-14	Waterton Lakes Entrance Road Archaeology Project
WRA-89-16	Pyramid Riding Stables Development ARIA, Jasper National Park
WRA-89-19	Banff Centre Development ARIA
WRA-89-20	Town of Banff General Municipal Plan Overview
WRA-89-24	Monitoring of Designated Canadian Heritage Rivers in Western Region national parks, Athabasca, North Saskatchewan
WRA-89-31	West Coast Petroleum Waterline Development - ARIA/Archaeological Monitoring - Contract KWR9070/Historical Resource Management, Rocky Mountain House National Historic Park
WRA-89-33	Archaeological Collections Management
WRA-89-34	Anthracite Cemetery Overview, Banff National Park
WRA-89-36	Waterton Lakes Park Management Plan Archaeological Resource Evaluation
WRA-89-39	Waterton Lakes Archaeological Resource Description and Analysis
WRA-89-40	Rocky Mountain House VRC Expansion - Archaeological Monitoring
WRA-89-41	Rocky Mountain House Northeast Fenceline ARIA
WRA-89-45	Archaeological Site Revisitation and Assessment, Elk Island National Park
WRA-89-46	Astotin Lake Day-Use Area Improvements - ARIA, Elk Island National Park

Table 21. continued

PROJECT #	DESCRIPTION
WRA-89-47	Sandy Beach Campground Development - ARIA, Elk Island National Park
WRA-89-48	Elk Handling Facility - ARIA, Elk Island National Park
WRA-89-51	Rock-cut Stabilization - Hwy. 93 Monitoring, Banff National Park
WRA-89-52	DPW TCH Archaeology - ARIA, Banff National Park
WRA-89-53	Alpine Club of Canada Youth Hostel, Lake Louise - ARIA, Banff National Park
WRA-89-54	Norquay Corral Construction - ARIA, Banff National Park
WRA-89-55	Water Well Installations - ARIA, Waterton Lakes National Park
WRA-89-56	TransAlta Utility Realignment - Overview, Waterton Lakes National Park
WRA-89-57	Middle Springs Housing Development Monitoring, Banff National Park
WRA-89-58	Middle Springs Horse Trail Bypass - ARIA, Banff National Park
WRA-89-59	Johnson Lake Dam Development - ARIA, Banff National Park
WRA-89-60	Spray River Trailhead Parking Lot Development - ARIA, Banff National Park
WRA-89-66	Banff Springs Storage Building Construction ARIA
WRA-89-70	Mount Norquay Ski Expansion - ARIA
WRA-89-71	Prescribed Fire Burn - ARIA, Banff National Park
WRA-89-73	TransAlta Cable Installation - ARIA, Banff National Park

Table 21. continued

PROJECT #	DESCRIPTION
WRA-89-74	Bankhead Access Road Rehabilitation - ARIA, Banff National Park
WRA-89-75	Moraine Lake Lodge Development - ARIA, Banff National Park
WRA-89-76	Waterton Lakes Entrance Road Construction ARIA/ Monitoring
WRA-89-77	Upper Bankhead Picnic Area Horse Ramp and Hitching Rail Installation - ARIA, Banff National Park
WRA-89-78	Bourgeau Trail reroute - ARIA, Banff National Park
WRA-89-79	Trans-Mountain Pipeline Easement Maintenance - ARIA
WRA-89-80	Banff Springs Convention Centre - ARIA, Banff National Park
WRA-89-81	Banff Springs Golf Course Road Realignment ARIA
WRA-89-82	Paradise Bungalows Expansion - ARIA, Banff National Park
WRA-89-83	Fairview Repeater Rehabilitation - ARIA, Banff National Park
WRA-89-84	Post Hotel Housing Devel. - ARIA, Banff National Park
WRA-89-85	Industrial Trade Complex Development - ARIA, Banff National Park
WRA-89-86	Lake Louise Station Restaurant and Housing Development ARIA, Banff National Park
WRA-89-90	Brewster Ten-Mile Cabin Demolition - ARIA, Banff National Park
WRA-89-91	Skoki Development - ARIA, Banff National Park
WRA-89-92	Harry's Hill Access Road Reroute - ARIA, Banff National Park

Table 21. continued

PROJECT #	DESCRIPTION
WRA-89-93	Ski Lake Louise Development- ARIA, Banff National Park
WRA-89-95	Maligne Lake Warden's Dock Construction - ARIA, Jasper National Park
WRA-89-96	Sulphur Ridge Trail Improvements - ARIA, Jasper National Park
WRA-89-97	Tonquin Trail Backcountry Improvements - ARIA, Jasper National Park
WRA-89-99	Saskatchewan Glacier Trailhead Redevelopment - ARIA, Jasper National Park
WRA-89-100	Community Horse Corral Construction - ARIA, Banff National Park
WRA-89-101	TransAlta Substn. Expansion ARIA, Banff National Park
WRA-89-102	Site 1340R Archaeological Resource Mitigation - Contract KWR9153(MT)/Historical Resource Management, Jasper National Park
WRA-89-103	Pine Bungalows Gas/Water Line Installation - Monitoring Jasper National Park
WRA-89-105	Lake Louise Medical Centre Development - ARIA, Banff National Park
WRA-89-107	CRM - Archaeological Site Revisitation and Assessment, Banff National Park
WRA-89-113	Alberta Power Development (Overview), Jasper National Park
WRA-89-114	Pinewoods Expansions - ARIA, Banff National Park
WRA-89-115	Entrance Gate Kiosk Utilities Installation - ARIA, Waterton Lakes National Park
WRA-89-116	Drafting/Mapping Project - Contract KWR9123/R. Lalonde

Table 21. continued

PROJECT #	DESCRIPTION
WRA-89-117	TransAlta Utility Realignment - ARIA, Contract KWR9120/E. Gryba, Waterton Lakes National Park
WRA-89-118	Jasper Park Lodge Development - ARIA, Contract KWR9137(DW)/E. Gryba
WRA-89-121	Timberline Lodge Utility Line - Overview, Banff National Park
WRA-89-122	Jasper Park Lodge Power Distribution Upgrading - Overview
WRA-89-123	Archaeological Site Revisitation and Assessment, Waterton Lakes National Park
WRA-89-127	Jasper Park Lodge Power Distribution Upgrading - ARIA (Contract)
WRA-89-130	Elk Island Archaeological Inventory
WRA-89-131	Elk Island Archaeological Resource Description/Analysis
WRA-89-134	Prince of Wales Hotel Water Supply Improvements - Overview, Waterton Lakes National Park
WRA-89-138	C-14 Dating (Contract - Brock University)
WRA-89-142	Northwest Utilities Improvement - Overview, Jasper National Park
WRA-89-143	Mount Norquay Sewer Main Expansion - Overview, Banff National Park
WRA-89-145	Castle Mountain Village Staff Accomodation Overview, Banff National Park
WRA-89-147	Editorial Review and Report Collation - ARDA (Contract Prager/KWR9191Y) Western Region
WRA-89-148	Tree Planting - Overview, Rocky Mountain House National Historic Park

ALBERTA RADIOCARBON DATES 1988-1989

By
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Archaeological Survey of Alberta

INTRODUCTION

This paper contains a list of all radiocarbon dates produced for the Archaeological Survey of Alberta between 1988 and 1989, subsequent to the previous listing in Beaudoin (1988). The format and style for this compilation are similar to those used in Beaudoin (1988), with the exception that, when bone has been dated, the species from which the bone was derived, if known, is included. The abbreviations used in the list are given in Table 22 and the radiocarbon dates follow in Table 23. Information for the dates is derived mainly from material on file at the Palynology Laboratory, Archaeological Survey of Alberta.

NOTE

This list is intended purely as an information resource for archaeologists and other researchers working in Alberta. Many of the dates are associated with ongoing projects. Anyone interested in a specific date is advised to go directly to the primary source for more detail or to consult the researcher(s) involved in the project.

ACKNOWLEDGMENTS

I wish to thank my colleagues at the Archaeological Survey of Alberta for their assistance in compiling and annotating this list and Dr. L.D. Arnold (Head, Environmental Isotopes, AEC Vegreville) for his comments on a previous version of the list.

Table 22. Explanation of abbreviations and conventions used in Table 23[1].

Site #	Borden designation for the sampled site. Sites associated with palaeoenvironmental studies are indicated by "PALAEO."
Site name	If the site is named, it is included here.
ASA #	File number assigned when sample is submitted through the Palynology Laboratory. Dates for which only information is on file are indicated by "F."
Latitude, Longitude	Approximate values reported to the nearest minute. Values of 30" are rounded down to the nearest minute.
Level	Vertical provenience of the dated material.
Depth	Given as cm or m beneath the surface unless otherwise stated. For samples from lake cores associated with palaeoenvironmental studies, the depth is usually measured from the sediment/water interface.
Association[2]	Cultural association or projectile point type associated with the dated material, as follows: AG - Agate Basin AV - Avonlea BE - Besant DU - Duncan HA - Hanna MC - Mummy Cave MK - McKean OW - Old Women's OX - Oxbow PL - Pelican Lake PAL - Palaeoenvironmental study
Material[2]	The kind of material dated and its condition, as follows: B - Burned BO - Bone C - Charred CH - Charcoal CO - Collagen CS - Core segment L - Calcined MC - Plant remains MX - Matrix OR - Organic material PE - Peat SED - Sediment SH - Shell WO - Wood

Table 22. continued

	Note that radiocarbon dates produced from bone samples by Environmental Isotopes at Vegreville (identified as "AECV") are from the collagen fraction unless otherwise indicated. For bone samples analyzed by other laboratories, the fraction analyzed is indicated, if known.
Lab #	Sample number assigned by the radiocarbon laboratory.
C-14	Date expressed in radiocarbon years BP, i.e. years before AD 1950. Most dates from the Vegreville laboratory, with sample numbers beginning "AECV," are δC-13 corrected relative to AD 1950. Dates less than 100 years BP are reported as "Modern." Apart from the δC-13 correction, if indicated, no other corrections have been applied to the dates.
SD	The standard deviation of the radiocarbon date.
Del C-13	If the date is δC-13 corrected, the δC-13 value is included here. The value is in permil (‰.) relative to a standard (PeeDee Belemnite or PDB). The correction applied to AECV dates in years is 16(δC-13 +25).
References	The report(s) or publication(s) that cite the date. If part of an ongoing study, the name(s) of the principal researcher(s) are given. The project permit number, if applicable, is also included here.
Comments	Any special notes are given here. For bone samples, the species, if known, is given. The following abbreviations may also be used: AMS - Accelerator date UN -Unreliable, usually due to contamination

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[1] Blank entries in any category indicate that no information is available.

[2] Some abbreviations used in Beaudoin (1988) for association and material are not included in this list. Abbreviations that are no longer relevant or have not been used in recent lists have been omitted.

Table 23. Radiocarbon dates from Alberta 1988-1989.

Site #	Site/Project Name	ASA #	Lat.	Long.	Level	Depth	Assoc.	Material
FdOt-9	Wells	F	52°9'	111°20'	5	45 cm	BE	BO
FdOt-9	Wells	F	52°39'	111°20'	2	17 cm	BE	BO
DgOv-72	Writing-On-Stone (Lancaster site)	D89-87	49°5'	111°38'	-	170 cm	-	CH
DgOv-72	Writing-On-Stone (Lancaster site)	D89-89	49°5'	111°38'	-	170 cm	-	CH
DgOv-72	Writing-On-Stone (Lancaster site)	D89-94	49°5'	111°38'	-	170 cm	-	BO
DiPl-3	-	D88-55	49°29'	113°58'	-	ca. 50 cm	-	BO
DjOw-1	Fletcher	D88-2	49°36'	111°49'	-	2.8 m	-	MC
DjPl-13	Oldman River Dam	D89-45	49°06'	114°00'	5	48-51 cm	-	CH
DjPl-13	Oldman River Dam	D89-8	49°06'	114°00'	5	48-50 cm	-	CH/MX
DjPl-13	Oldman River Dam	D89-18	49°06'	114°00'	1	0-10 cm	-	BO
DjPl-13	Oldman River Dam	D89-19	49°06'	114°00'	2	10-20 cm	AV	BO
DjPl-13	Oldman River Dam	D89-24	49°06'	114°00'	4	30-40 cm	-	BO
DjPl-13	Oldman River Dam	D89-29	49°06'	114°00'	3	20-30 cm	-	BO
DjPl-3	Oldman River Dam	D89-22	49°06'	114°00'	2	10-20 cm	-	BO
DjPl-3	Oldman River Dam	D89-28	49°06'	114°00'	3	20-30 cm	-	BO
DjPm-100	Oldman River Dam	D89-3	49°36'	114°07'	1	15 cm	-	CH/MX
DjPm-100	Oldman River Dam	D89-5	49°36'	114°07'	2	15-18 cm	AV	CH/MX
DjPm-100	Oldman River Dam	D89-16	49°36'	114°07'	3	35-45 cm	-	BO
DjPm-100	Oldman River Dam	D89-59	49°36'	114°06'	3	30 cm	-	BO
DjPm-100	Oldman River Dam	D89-58	49°36'	114°06'	6	60 cm	-	BO
DjPm-100	Oldman River Dam	D89-55	49°36'	114°06'	10	100 cm	-	BO
DjPm-102	Oldman River Dam	D89-57	49°36'	114°06'	3	30 cm	-	BO

Lab #	C-14 date	SD	Del C-13 value	References & permit #	Comments
Beta-23700	1540	60	-	Stuart 1988; Stuart 87-34	-
Beta-23701	1140	80	-	Stuart 1988; Stuart 87-34	-
AECV 962C	270	80	-24.8	Vickers 89-21	-
AECV 964C	580	180	-24.1	Vickers 89-21	-
AECV 966C	220	80	-22.3	Vickers 89-21	-
AECV 706C	490	90	-17.4	Brink	-
TO-1097	9380	110	-	Vickers 87-55; Vickers and Beaudoin 1989	AMS; Seed sample
AECV 747C	500	110	-21.8	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 748C	470	80	-19.6	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 753C	2060	120	-17.8	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 758C	1610	90	-19.0	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 731C	2770	110	-23.1	Van Dyke 88-39; Van Dyke et al. 1989	-
AECV 738C	2720	100	-24.8	Van Dyke 88-39; Van Dyke et al. 1989	-
AECV 751C	4210	90	-20.7	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 757C	4360	90	-20.2	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 745C	1380	90	-17.4	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 734C	930	130	-25.3	Van Dyke 88-39; Van Dyke et al. 1989	-
AECV 736C	630	80	-24.7	Van Dyke 88-39; Van Dyke et al. 1989	-
AECV 863C	2450	90	-16.9	Landals 88-38; Landals 1989	Bison
AECV 862C	1760	90	-15.0	Landals 88-38; Landals 1989	Bison
AECV 861C	950	90	-15.8	Landals 88-38; Landals 1989	Bison
AECV 865C	3250	110	-18.3	Landals 88-38; Landals 1989	Bison

Table 23. continued

Site #	Site/Project Name	ASA #	Lat.	Long.	Level	Depth	Assoc.	Material
DjPm-102	Oldman River Dam	D89-56	49°36'	114°06'	9	90 cm	-	BO
DjPm-11	Oldman River Dam	D89-38	49°34'	114°01'	19	164-183 cm	-	BO
DjPm-11	Oldman River Dam	D89-62	49°34'	114°01'	6	67 cm	-	BO
DjPm-114	Oldman River Dam	D88-46	49°36'	114°03'	3	30 cm	-	BO
DjPm-114	Oldman River Dam	D88-47	49°36'	114°03'	5	50-60 cm	-	BO
DjPm-114	Oldman River Dam	D89-49	49°36'	114°03'	2	22 cm	-	BO
DjPm-116	Oldman River Dam	D89-48	49°36'	114°04'	15	160 cm	PL	BO
DjPm-116	Oldman River Dam	D89-47	49°36'	114°04'	205 cm	205 cm	-	BO
DjPm-116	Oldman River Dam	D89-46	49°36'	114°04'	180 cm	180 cm	-	BO
DjPm-122	Oldman River Dam	D89-60	49°36'	114°02'	5	50 cm	-	BO
DjPm-126	Oldman River Dam	D88-49	49°36'	114°00'	3	50 cm	-	BO
DjPm-126	Oldman River Dam	D89-67	49°36'	114°00'	4	82 cm	-	BO
DjPm-126	Oldman River Dam	D89-66	49°36'	114°00'	8	146 cm	-	BO
DjPm-126	Oldman River Dam	D89-65	49°36'	114°00'	15	230 cm	-	BO
DjPm-16	Oldman River Dam	D89-17	49°36'	114°05'	24	225-245 cm?	-	BO
DjPm-198	Oldman River Dam	D89-27	49°36'	114°01'	7	60-70 cm	-	BO
DjPm-222	Oldman River Dam	D88-51	35°35'	114°00'	12	105 cm	-	BO
DjPm-223	Oldman River Dam	D88-52	49°35'	114°01'	3	85 cm	-	BO
DjPm-225	Oldman River Dam	D88-53	49°34'	114°01'	1	55 cm	-	BO
DjPm-225	Oldman River Dam	D88-54	49°34'	114°01'	3	70	-	BO
DjPm-227	Oldman River Dam	D89-54	49°36'	114°06'	6	30 cm	-	BO
DjPm-227	Oldman River Dam	D89-53	49°36'	114°06'	5	50 cm	-	BO
DjPm-227	Oldman River Dam	D89-52	49°36'	114°06'	13	130 cm	-	BO

Lab #	C-14 date	SD	Del C-13 value	References & permit #	Comments
AECV 864C	330	90	-18.6	Landals 88-38; Landals 1989	Bison
AECV 767C	2590	90	-20.8	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 854C	870	110	-18.6	Landals 88-38; Landals 1989	Bison
AECV 696C	430	80	-19.3	Landals 88-38; Landals 1989	-
AECV 697C	2090	260	-18.7	Landals 88-38; Landals 1989	-
AECV 866C	1530	90	-17.7	Landals 88-38; Landals 1989	Bison
AECV 869C	2720	110	-18.5	Landals 88-38; Landals 1989	Bison
AECV 868C	2650	140	-22.2	Landals 88-38; Landals 1989	Bison
AECV 867C	2290	100	-17.9	Landals 88-38; Landals 1989	Bison
AECV 870C	710	90	-17.4	Landals 88-38; Landals 1989	Bison
AECV 699C	670	100	-19.1	Landals 88-38; Landals 1989	-
AECV 860C	960	80	-20.3	Landals 88-38; Landals 1989	Bison
AECV 859C	460	80	-12.5	Landals 88-38; Landals 1989	Bison
AECV 858C	520	90	-14.5	Landals 88-38; Landals 1989	Bison
AECV 746C	9600	210	-15.5	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 756C	2120	90	-19.2	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 701C	560	100	-19.7	Landals 88-38; Landals 1989	-
AECV 702C	430	90	-20.2	Landals 88-38; Landals 1989	-
AECV 703C	750	140	-20.4	Landals 88-38; Landals 1989	-
AECV 704C	640	90	-19.9	Landals 88-38; Landals 1989	-
AECV 875C	6730	110	-16.6	Landals 88-38; Landals 1989	Bison
AECV 874C	740	90	-15.2	Landals 88-38; Landals 1989	Bison
AECV 873C	760	110	-15.1	Landals 88-38; Landals 1989	Bison

Table 23. continued

Site #	Site/Project Name	ASA #	Lat.	Long.	Level	Depth	Assoc.	Material
DjPm-227	Oldman River Dam	D89-51	49°36'	114°06'	1	40 cm	-	BO
DjPm-227	Oldman River Dam	D89-50	49°36'	114°06'	3	185 cm	-	BO
DjPm-228	Oldman River Dam	D89-39	49°35'	114°00'	4	30-40 cm	-	BO
DjPm-228	Oldman River Dam	D89-43	49°35'	114°00'	2	10-20 cm	-	BO
DjPm-36	Oldman River Dam	D89-6	49°35'	114°03'	4	33-36 cm	-	CH
DjPm-36	Oldman River Dam	D89-12	49°35'	114°03'	7	60-70 cm	-	BO
DjPm-36	Oldman River Dam	D89-13	49°35'	114°03'	13	120-130 cm	-	BO
DjPm-36	Oldman River Dam	D89-14	49°35'	114°03'	21	200-214 cm	-	BO
DjPm-36	Oldman River Dam	D89-31	49°35'	114°03'	19	188 cm	-	BO
DjPm-36	Oldman River Dam	D89-33	49°36'	114°03'	15	140-150 cm	-	BO
DjPm-36	Oldman River Dam	D89-41	49°35'	114°01'	11	110-110 cm	-	BO
DjPm-41	Oldman River Dam	D89-61	49°34'	114°01'	11	119 cm	-	BO
DjPm-44	Oldman River Dam	D89-4	49°35'	114°01'	2	10-20 cm	-	CH
DjPm-44	Oldman River Dam	D89-11	49°35'	114°01'	9	80-90 cm	-	BO
DjPm-44	Oldman River Dam	D89-20	49°35'	114°01'	4	30-40 cm	-	BO
DjPm-44	Oldman River Dam	D89-30	49°35'	114°01'	7	60-70 cm	-	BO
DjPm-44	Oldman River Dam	D89-32	49°35'	114°01'	1	0-15 cm	-	BO
DjPm-44	Oldman River Dam	D89-35	49°35'	114°01'	10	90-100 cm	-	BO
DjPm-44	Oldman River Dam	D89-44	49°35'	114°01'	6	50-60 cm	-	BO
DjPm-66	Oldman River Dam	D89-34	49°36'	114°03'	3	23-26 cm	-	BO
DjPm-79	Oldman River Dam	D89-21	49°36'	114°07'	4	30-40 cm	-	BO
DjPm-80	Oldman River Dam	D88-44	49°36'	114°06'	4	30-40 cm	-	BO
DjPm-84	Oldman River Dam	D89-10	49°37'	114°07'	3	20-30 cm	-	BO

Lab #	C-14 date	SD	Del C-13 value	References & permit #	Comments
AECV 872C	340	80	-17.9	Landals 88-38; Landals 1989	Bison
AECV 871C	620	140	-17.0	Landals 88-38; Landals 1989	Bison
AECV 768C	2530	90	-19.5	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 772C	2480	100	-18.2	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 741C	3000	170	-18.8	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 742C	7690	210	-20.2	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 743C	7740	190	-18.8	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 760C	7980	180	-18.0	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 762C	7890	130	-22.4	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 770C	6690	310	-17.4	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 737C	4900	130	-25.3	Van Dyke 88-39; Van Dyke et al. 1989	-
AECV 855C	1600	90	-16.4	Landals 88-38; Landals 1989	Bison
AECV 740C	3600	100	-19.0	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 749C	1880	100	-19.1	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 759C	2690	140	-26.6	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 761C	1820	90	-17.5	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 764C	3520	210	-20.1	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 735C	1630	480	-25.7	Van Dyke 88-39; Van Dyke et al. 1989	-
AECV 773C	2770	120	-19.4	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 763C	3570	220	-22.0	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 750C	940	90	-19.4	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 694C	290	160	-20.5	Landals 88-38; Landals 1989	-
AECV 739C	1290	120	-19.6	Van Dyke 88-39; Van Dyke et al. 1989	Bison

Table 23. continued

Site #	Site/Project Name	ASA #	Lat.	Long.	Level	Depth	Assoc.	Material
DjPm-84	Oldman River Dam	D89-15	49°37'	114°07'	2	10-20 cm	-	BO
DjPm-84	Oldman River Dam	D89-36	49°37'	114°07'	5	40-50 cm	-	BO
DjPm-84	Oldman River Dam	D89-40	49°37'	114°07'	2	10-20 cm	-	BO
DjPm-84	Oldman River Dam	D89-42	49°36'	114°07'	4	30-40 cm	-	BO
DjPm-88	Oldman River Dam	D89-64	49°36'	114°03'	7	63 cm	-	BO
DjPm-88	Oldman River Dam	D89-63	49°36'	114°03'	8	83 cm	-	BO
DjPm-89	Oldman River Dam	D88-45	49°36'	114°03'	3	30 cm	-	BO
DjPm-98	Oldman River Dam	D89-23	49°36'	114°07'	3	20-30 cm	-	BO
DjPm-98	Oldman River Dam	D89-26	49°36'	114°07'	7	60-70 cm	-	BO
DjPm-98	Oldman River Dam	D89-37	49°36'	114°07'	7	60-70 cm	-	BO
DkPj-1	Head-Smashed-In Buffalo Jump	D89-75	49°43'	113°39'		-	-	BO
DkPj-1	Head-Smashed-In Buffalo Jump	D88-4	49°43'	113°39'	-	-	-	Hide
EgPs-48	Bow Corridor	D88-19	51°03'	115°08'	3	3.84 m	-	CH/MX
EgPs-48	Bow Corridor	D88-20	51°03'	115°08'	3	3.72 m	-	CH/MX
EgPs-48	Bow Corridor	D88-26	51°03'	115°08'	4	3.80 m	-	CH/MX
EgPs-48	Bow Corridor	D88-28	51°03'	115°08'	5	3.95 m	-	CH/MX
EgPs-48	Bow Corridor	D88-29	51°03'	115°08'	6	4.04 m	-	CH/MX
EgPs-48	Bow Corridor	D88-31	51°03'	115°08'	3	3.72 m	-	CH/MX
EgPs-48	Bow Corridor	D88-33	51°03'	115°08'	5	3.92 m	-	CH/MX
EgPs-48	Bow Corridor	D88-35	51°03'	115°08'	1	2.31 m	-	CH/MX
EgPs-48	Bow Corridor	D88-36	51°03'	115°08'	2	1.45 m	-	CH/MX
EgPs-48	Bow Corridor	D88-37	51°03'	115°08'	3	1.15 m	-	CH/MX
EgPt-3	Bow Corridor	D88-14	51°03'	115°12'	425 cm	425 cm	-	BO
EhPp-56	Marchand Kill	D88-18	51°14'	114°39'	-	Surface	-	BO
EjPu-1	Panther River	D88-1	52°32'	115°21'	0-10 cm	0-10 cm	-	BO
ElPb-3	ElPb-3 Mitigation	D89-68	51°58'	112°13'	2	0-10 cm	-	BO
ElPb-3	ElPb-3 Mitigation	D89-69	51°58'	112°13'	2	10-20 cm	-	BO
ElPb-3	ElPb-3 Mitigation	D89-70	51°58'	112°13'	3	20-30 cm	-	BO

Lab #	C-14 date	SD	Del C-13 value	References & permit #	Comments
AECV 744C	780	90	-18.6	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 765C	1260	160	-18.9	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 769C	530	80	-19.4	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 771C	750	150	-18.7	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 857C	3600	90	-14.7	Landals 88-38; Landals 1989	Bison
AECV 856C	1860	90	-16.3	Landals 88-38; Landals 1989	Bison
AECV 695C	410	100	-19.0	Landals 88-38; Landals 1989	-
AECV 752C	1190	90	-19.4	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 755C	2510	90	-19.0	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 766C	2520	110	-19.9	Van Dyke 88-39; Van Dyke et al. 1989	Bison
AECV 843C	5120	100	-19.7	Brink	Bison
SFU-1144	260	80	-20.2	Brink	AMS; Udder head-dress
AECV 658C	7040	360	-24.0	Newton 88-30	-
AECV 679C	7500	190	-26.1	Newton 88-30	-
AECV 664C	7230	120	-22.5	Newton 88-30	-
AECV 666C	7570	120	-23.8	Newton 88-30	-
AECV 667C	7570	110	-24.2	Newton 88-30	-
AECV 669C	7350	140	-25.0	Newton 88-30	-
AECV 671C	8250	130	-25.2	Newton 88-30	-
AECV 673C	5720	150	-24.3	Newton 88-30	-
AECV 674C	4260	100	-23.7	Newton 88-30	-
AECV 675C	3170	100	-23.6	Newton 88-30	-
AECV 624C	7810	120	-19.6	Newton 88-30	-
AECV 630C	400	80	-18.8	Ronaghan	-
AECV 590C	470	90	-20.1	Head 87-86	-
AECV 844C	360	90	-18.8	Light 88-76	Bison
AECV 845C	850	90	-18.5	Light 88-76	Bison
AECV 846C	550	80	-8.1	Light 88-76	Bison; C-13 value highly suspect

Table 23. continued

Site #	Site/Project Name	ASA #	Lat.	Long.	Level	Depth	Assoc.	Material
ElPb-3	ElPb-3 Mitigation	D89-71	51°58'	112°13'	4	30-40 cm	-	BO
ElPb-3	ElPb-3 Mitigation	D89-73	51°58'	112°13'	2	10-20 cm	-	CH/MX
FjPi-29	Strathcona	D89-100	53°33'	113°23'	G	44 cm	-	BO
FjPi-29	Strathcona	D89-101	53°33'	113°23'	H	46 cm	-	BO
FjPi-29	Strathcona	D89-102	53°33'	113°23'	D	25 cm	-	BO
GgQq-7	"Wood Bog"	D88-56	55°09'	118°43'	-	ca. 105-110 cm	PAL	PE
GgQq-7	"Wood Bog"	D88-57	55°09'	118°43'	-	ca. 200-205 cm	PAL	OM
GgQq-7	"Wood Bog"	D88-58	55°09'	118°43'	-	ca. 175-180 cm	PAL	OM
GgQq-7	"Wood Bog"	D88-59	55°09'	118°43'	-	ca. 270-275 cm	PAL	OM
GhQt-4	Saskatoon Hill	D89-79	55°14'	119°19'	P1	55 cm	-	CH/MX
GhQt-4	Saskatoon Hill	D89-80	55°14'	119°19'	52 cm	52 cm	-	SED
GhQt-4	Saskatoon Hill	D89-81	55°14'	119°19'	42 cm	42 cm	-	SED
GhQt-4	Saskatoon Hill	D89-82	55°14'	119°19'	80 cm	80 cm	-	CH/MX
GlQp-6	Historic Dunvegan	D89-95	55°55'	118°36'	5	60-65 cm	-	CH/MX
GlQp-6	Historic Dunvegan	D89-96	55°55'	118°36'	7	60-65 cm	-	CH/MX
GlQp-6	Historic Dunvegan	D89-97	55°55'	118°36'	9	55-65 cm	-	CH/MX
GlQp-6	Historic Dunvegan	D89-98	55°55'	118°36'	7	30-35 cm	-	CH/MX
GlQp-6	Historic Dunvegan	D89-99	55°55'	118°36'	4	20-25 cm	-	CH/MX
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	95 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	170 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	60 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	75 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	80 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	100 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	140 cm	-	SED

Lab #	C-14 date	SD	Del C-13 value	References & permit #	Comments
AECV 847C	3420	100	-19.0	Light 88-76	Bison
AECV 848C	2620	940	-25.8	Light 88-76	Large SD due to small sample size
AECV 996C	2320	140	-19.4	Otelaar 89-10	Bison
AECV 997C	800	90	-20.5	Otelaar 89-10	Bison
AECV 998C	1170	90	-19.9	Otelaar 89-10	Bison
AECV 707C	5520	100	-28.3	Beaudoin	-
AECV 722C	8130	1330	-27.9	Beaudoin	Approximate date; small sample size
AECV 723C	8990	360	-30.5	Beaudoin	-
AECV 724C	9200	130	-27.2	Beaudoin	Basal date for wood layer
AECV 853C	5530	170	-24.9	Wright 89-33	-
AECV 922C	4960	150	-23.9	Wright 89-33	-
AECV 923C	5160	230	-24.1	Wright 89-33	-
AECV 924C	8130	130	-22.6	Wright 89-33	-
AECV 967C	960	90	-25.0	Smith 89-20	-
AECV 968C	1870	90	-26.2	Smith 89-20	-
AECV 969C	1850	200	-23.5	Smith 89-20	-
AECV 970C	1700	140	-25.3	Smith 89-20	-
AECV 971C	670	120	-25.3	Smith 89-20	-
AECV 559C	4590	100	-24.2	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 560C	5520	100	-22.6	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 573C	3160	100	-24.5	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 574C	4370	100	-25.1	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 575C	3430	70	-25.7	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 576C	4640	100	-24.4	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 577C	4500	100	-24.8	Bobrowsky et al. 1988; Bobrowsky 88-5	-

Table 23. continued

Site #	Site/Project Name	ASA #	Lat.	Long.	Level	Depth	Assoc.	Material
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	150 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	170 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	210 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	220 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	225 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	260 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	60 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	170 cm	-	SED
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	190 cm	-	Antler
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	180 cm	-	BO
HcQh-6	Peace River Pulp Mill	F	56°22'	117°11'	-	95 cm	-	SED
PALAEO	Pembina River	D88-3	54°08'	114°13'	-	ca. 4 m	PAL	WO
PALAEO	Lorraine Lake	D88-5	52°45'	117°40'	-	232-242 cm	PAL	MC/C
PALAEO	Solomon Creek	D88-11	53°21'	117°50'	-	ca. 4.5 m	PAL	WO
PALAEO	Solomon Creek	D88-12	53°21'	117°50'	-	c. 4.5 m	PAL	WO
PALAEO	Birch Hills	D88-13	55°40'	118°22'	-	115-120 cm	PAL	PE
PALAEO	Grand Prairie	D88-17	55°05'	118°50'	-	20 m	PAL	OR
PALAEO	Valleyview	D88-41	55°00'	117°00'	-	71-76 cm	PAL	CS/PE
PALAEO	Valleyview	D88-42	55°00'	117°00'	-	40-45 cm	PAL	CS/PE
PALAEO	Valleyview	D89-83	55°00'	117°00'	-	120-130 cm	PAL	CS/PE
PALAEO	Valleyview	D89-84	55°00'	117°00'	-	220-231 cm	PAL	CS/PE
PALAEO	Valleyview	D89-85	55°00'	117°00'	-	170-180 cm	PAL	CS/PE
PALAEO	Moore Lake	D89-77	54°35'	110°30'	-	90-110 cm	PAL	CS
PALAEO	Moore Lake	D89-76	54°35'	110°30'	-	190-210 cm	PAL	CS
-	Red Deer Stone Bowl	D89-103	-	-	-	-	-	Starch

Table 23. continued

Lab #	C-14 date	SD	Del C-13 value	References & permit #	Comments
AECV 578C	4390	100	-25.1	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 579C	5340	100	-25.0	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 580C	5620	100	-25.2	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 581C	5690	100	-25.4	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 582C	7010	120	-25.4	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 583C	7300	110	-26.3	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 584C	2870	110	-24.6	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 585C	5310	110	-25.1	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 586C	4250	100	-21.3	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 587C	3440	120	-20.6	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 588C	4600	100	-24.1	Bobrowsky et al. 1988; Bobrowsky 88-5	-
AECV 589C	3190	100	-25.7	D.G. Smith	-
AECV 591C	9180	320	-27.0	Bear 1989	-
AECV 621C	4340	100	-23.5	Beaudoin	-
AECV 622C	4330	100	-26.0	Beaudoin	-
AECV 623C	2030	90	-24.5	Wright 89-33	Basal date for peat bog
AECV 627C	4030	180	-24.6	Halsey 1989	-
AECV 687C	2180	90	-26.2	B.J. Nicholson, in prep.	Basal date for peat bog
AECV 688C	1670	100	-26.0	B.J. Nicholson, in prep.	Basal date for peat bog
AECV 925C	3140	90	-26.4	B.J. Nicholson, in prep.	-
AECV 926C	4740	100	-27.1	Zoltai and Vitt 1990	-
AECV 927C	2400	90	-26.0	B.J. Nicholson, in prep.	-
AECV 886C	4620	100	-28.0	M. Hickman, in prep.	-
AECV 885C	3090	100	-30.2	M. Hickman, in prep.	-
TO-1657	5400	110	-	Ball/Red Deer Museum	AMS; Starch residue from bowl

RESEARCH NOTE

PICTOGRAPH LOCATIONS REVEALED

By

Martin Magne
Archaeological Survey of Alberta

Photographs of two "unknown" pictographs, published in Archaeology in Alberta, 1987 (Klassen and Magne 1988:68), have been positively identified. These photographs were brought to the Archaeological Survey of Alberta by an individual who had obtained them from a friend now deceased. He believed the pictographs to be from northern Alberta but was unable to provide a precise location.

In January of 1989, Duncan Sherberger, Archaeological Information Officer with the Archaeological Research Centre of the Toronto Board of Education, Department of Continuing Education, wrote to inform us that the two pictographs are known as the "Bloodvein Bison" and the "Bloodvein Shaman." According to Dewdney and Kidd (1967:59-61), they are to be found on the Bloodvein River, ". . . some eighty miles northwest of Red Lake, in the Lake Winnipeg water-shed."

Case closed.

ABSTRACTS FOR 1988 and 1989 PERMITS

Compiled by
Diane Luther and Martina Purdon

The following are all available abstracts for permits issued in 1988 and 1989. We thank all those permit holders who submitted abstracts by our publication deadline and advise readers to consider the material in light of its preparation date.

CRM

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

AEC Oil and Gas Co.
1988 Suffield Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area is situated in the northwest corner of the Suffield Military Reserve on open, rolling prairie.

METHODOLOGY: The HRIA consisted of a foot and vehicle traverse survey of 21 segments of 15 m wide in-fill pipeline rights-of-way. The segments were all located in areas considered to have a moderate-high potential for containing historical resources sites.

RESULTS: One new surface stone feature site (EeOr-87) was identified.

SITE TYPES: EeOr-87 is a surface stone feature containing one stone circle and two cairns.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Series of Proposed Pipeline Rights-of-way on the Suffield Military Reserve, Alberta," by Barry J. Dau

88-1

Bea Loveseth
Lifeways of Canada
1717 - 10 Avenue S.W.
Calgary, Alberta

Cargill Limited/Brisbin
Gates Engineering
High River Beef
Processing Facility

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed development area is located on the north side of Tongue Creek directly west of the CPR Calgary-Fort Macleod branch line and east of Highway 2A. Construction and operational access roads will parallel this spur line. The plant site sits on a broad, flat, abandoned floodplain of Tongue Creek. Glacial till and lacustrine deposits occur along the northern site edge. Prairie grasslands lie between the proposed plant site and Tongue Creek to the south and on the east side of the CPR. The land is very open and exposed to the prevailing westerly winds which sweep the landscape most of the year.

METHODOLOGY: Foot traverses of the area were conducted, and backhoe testing were undertaken in areas where potential for buried soils and possible subsurface cultural remains existed. Six backhoe pits were excavated in the plant site area to search for buried archaeological sites.

RESULTS: No sites were located.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Beef Processing Facility, Cargill Limited, High River, Alberta, ASA Permit 88-01," by Bea Loveseth

88-2

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Morrison Petroleums
Canadian Landmaster
Grand Forks Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area is situated on open prairie just east of confluence of the Oldman and Bow rivers, north of the village of Grassy Lake.

METHODOLOGY: Approximately 1650 m of 15 m wide pipeline rights-of-way and a 1.0 ha battery site were examined using foot and vehicle traverse surveys. Shovel testing was attempted but was unsuccessful due to frozen ground.

RESULTS: No historical resources sites were located.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Pipeline Project at the Grand Forks, Southeastern Alberta ASA Permit 88-2," by Barry J. Dau

88-3

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

American Trading
Well Site and Access Road

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site and associated access road are located in the Elkwater area of southeastern Alberta, in the plains physiographic region.

METHODOLOGY: Because snow cover obscured the area and because construction was imminent, the development zones were monitored during construction. Since the ground was frozen, shovel tests were not excavated.

RESULTS: No historical resource sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment American Trading and Production Corporation, Mark Dunmore Well Site and Access Road," by E. J. McCullough

88-4

John H. Brumley
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Alberta Environment
Oldman Dam
Reservoir Gravel Pit
Locations

PROJECT TYPE: HRIA

LOCATION/SETTING: The project involved backhoe monitoring of four proposed gravel pit locations within the Oldman River Dam Reservoir. As well, a single stockpile location and two sections of proposed haul road were surveyed.

METHODOLOGY: On-site inspection of materials removed from excavated backhoe pits was conducted in search of buried cultural materials. On-foot traverses and limited shovel testing were done along the haul road segments and in the stockpile location.

RESULTS: No new archaeological sites were encountered; however, previously recorded sites DjPl-3 and 11 and DjPm-65, 122, 124, 125, 128, 130, 220 and 224 were located within or adjacent to proposed development areas. These sites were evaluated in terms of proposed developments, and a program of site area avoidance and topsoil removal monitoring was recommended in various locales.

SITE TYPES: Buried campsite, surface stone feature and bison kill sites

REPORT: Complete, entitled " Historic Resource Impact Assessment of Various Proposed Gravel Pit Locations within the Oldman Dam Reservoir Project Area Completed in Partial Fulfillment of ASA Permit 88-4 - Final Report, by John Brumley

88-5

Peter T. Bobrowsky
407, 2341 Harbour Road
North Saanich (Sidney)
British Columbia

Diashowa Canada/
Pacific Liacon Ltd.
Peace River Kraft Pulp
Mill

PROJECT TYPE: Mitigation

LOCATION/SETTING: Site HcQh-6 is located on the west bank of Peace River, 12 km NNE of town of Peace River, Alberta.

METHODOLOGY: Four large backhoe trenches were excavated within the limits of site HcQh-6. Trench #1 was located centrally within the planned limits of the water treatment facilities. Trench #2 was an "L-shaped" trench located northwest of Trench #1. Trenches #3 and 4 were located north of the first trench. Bulk soil samples were removed at regular intervals vertically down the north face of Trench #1, and 49 bulk samples were removed from Trench #4. Palaeosol surfaces were traced, mapped and photomosaically studied along each trench face and along 90 m of riverbank exposure. Samples were taken from each palaeosol, as well as from intervening sediments between each palaeosol. Eighteen C-14 samples were obtained from the site. Laboratory analysis of the samples included particle size analysis, determination of % moisture content, % organic matter, % carbonate, and % total carbon. Geotechnical analyses included moisture content, liquid limit, plastic limit, plasticity index and liquidity index.

RESULTS: Nine major buried soil surfaces were discovered. Bone, antler and organic sediment were recovered and dated. Episodic sedimentation at the floodplain site and C-14 analysis indicates sporadic human occupation at this site began approximately 7300 ± 110 years BP (AECV 583C). Prehistoric occupation stopped approximately 3160 ± 100 years BP (AECV 573C) at this site and 2670 ± 110 years BP (AECV 584C) at the neighboring site HcQh-7. A total of 40 artifacts was retrieved from the site, including flakes, ground stone hammers, a uniface chopper and unaltered faunal material (elk).

SITE TYPE: Prehistoric campsite

REPORT: Complete, entitled "A Geological and Archaeological Study of HcQh-6, Peace River, Alberta (Permit 88-5)," by P. T. Bobrowsky, E. R. Damkjar, and T. H. Gibson.

88-6

Eric Damkjar
E.R.D. Heritage Consulting
7701 - 86 Avenue
Edmonton, Alberta

Alberta Resources Railway/Alberta Economic Development and Trade
Alberta Resources Railway Spur/ Daishowa Railway Spur

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed railway spur runs from the town of Peace River, north for 19 km to the proposed Peace River Kraft Mill. The right-of-way follows largely undisturbed terraces along the west shore of the Peace River.

METHODOLOGY: The entire right-of-way was traversed on foot and assessed by judgmental shovel testing and inspection of exposed surfaces.

RESULTS: A single prehistoric site (HbQh-16), consisting of a large quartzite core/chopper and four fragments of large mammal bone, was discovered on top of a grass-covered knoll, approximately 2 km north of the town of Peace River.

SITE TYPES: Prehistoric campsite

REPORT: Complete, entitled "Historical Resources Impact Assessment, Alberta Resources Railway Spur to the Peace River Kraft Mill, Townships 83-85, Range 21, W5M," by Eric Damkjar

88-7

Stanley Van Dyke
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Royal Bank/UMA
Engineering
Cochrane Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The 85 ha subdivision project is located immediately west of Cochrane, Alberta. Prehistoric stone circle sites EhPo-40, 72 and 73 and EhPp-51 were investigated previously in this area under permit 83-10.

METHODOLOGY: Foot traverse of area of study with shovel testing in each of the relocated stone circles.

RESULTS: EhPp-51 consists of one cairn and four stone circles associated with a 1140 m terrace. EhPo-72 consists of two cairns, a hearth and 17 stone circles and is associated with a 1145 m terrace. EhPi-40 is associated with a terrace plateau and contains 53 stone circles. EhPo-73 contains six stone circles. Eight of 86 shovel tests yielded FBR. Three shovel tests yielded flakes.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment West Valley Development, ASA Permit Number 88-7," by Stanley Van Dyke

88-8

Thomas H. Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Town of Pincher Creek
Community Park

PROJECT TYPE: HRIA

LOCATION/SETTING: The park is located east of the community of Pincher Creek along the southern edge of Pincher Creek. Development will affect an area of approximately 10 ha and will include assorted recreational facilities.

METHODOLOGY: The development area was examined on foot, focusing on existing surface exposures. In areas that lacked exposure, shovel and backhoe testing were undertaken.

RESULTS: A single, stratified prehistoric campsite (DiPl-2) was identified. It is characterized by a diffuse distribution of fire-broken rock and bone at 15 and 40 cm below surface. The site was deemed not significant, and additional work was not recommended.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Pincher Creek Recreational Park LSD-15 and 16-23-6-30-W4M," by Thomas H. Head

88-9

Jack Brink
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Alberta Culture and Multiculturalism
Head-Smashed-In Buffalo Jump

PROJECT TYPE: Research

LOCATION/SETTING: Head-Smashed-In Buffalo Jump is located in southwestern Alberta on the southern edge of the Porcupine Hills, about 16 km west of the town of Fort Macleod.

METHODOLOGY: Excavations were conducted in the processing area of the site, on the prairie level below the kill. The basic unit of excavation was the 1 x 1 m square, excavated in arbitrary 10 cm levels, usually to a final depth of about 50 cm. All dirt was passed through a 1/4 inch screen. All lithic artifacts larger than 1 cm in any dimension were mapped in three dimensions. All identifiable bone was plotted on map sheets for each arbitrary level. Features were individually excavated and recorded.

RESULTS: An area of about 16 sq. m was excavated during the 1988 field season. This represents an addition to the area excavated during the previous season, and the long range goal for the project is to continue excavation of one large contiguous region of the processing area. Results were generally similar to those of the previous year in that high density and large number of badly fragmented and weathered bison bones were recovered, along with large numbers of small-sized lithic tool debitage and tool fragments. The excavation of a large, circular subsurface pit feature, originally encountered in 1987, was completed in 1988. Other features included several hearths and ash stains, as well as upright clusters of bison bones. As always, fire-broken rocks occurred by the tonne (literally).

SITE TYPES: Buffalo jump and associated processing/butchering area

REPORT: In preparation

88-10

Eric Damkjar
E.R.D. Heritage Consulting
7701 - 86 Avenue
Edmonton, Alberta

Alberta Recreation and Parks/Village of Innisfree
Innisfree Recreation Area

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed development involves improvement of an existing park and campsite covering ca. 17 ha, situated on the northeast shore of Birch Lake, near the village of Innisfree, approximately 130 km east of Edmonton.

METHODOLOGY: The entire area was traversed on foot and assessed by examining exposed surfaces and excavating 94 shovel tests using a combination of judgmental and systematic survey strategies.

RESULTS: No sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment of Proposed Innisfree Recreation Area," by Eric Damkjar

88-11

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Morrison Petroleums / Canadian Landmasters
Grassy Lake Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The well site is located in LSD 12-12-11-13-W4M on the southern rim of the South Saskatchewan River valley, just downstream from the confluence of the Bow and Oldman rivers.

METHODOLOGY: The proposed well site is within the confines of a major, previously recorded stone circle site (DlOv-3). The HRIA was intended to determine what kind of impact the well site would have on DlOv-3 and to lessen or eliminate that impact. The well site and its associated access road were examined by foot traverse survey. The portion of DlOv-3 inside and within 100 m of the well site was mapped.

RESULTS: The well site could not be moved from its location; however, the boundaries of the lease were altered, and the access road was re-routed to avoid all visible features in DlOv-3.

SITE TYPE: DlOv-3 contains stone circles and cairns.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Oil Wellsite Near Grassy Lake, Southeastern Alberta ASA Permit 88-11," by Barry J. Dau

88-12

Raymond LeBlanc
Dept. of Anthropology
University of Alberta
Edmonton, Alberta

University of Alberta
Lesser Slave Lake
Slump Site

PROJECT TYPE: Research/archaeology field school

LOCATION/SETTING: The Slump site is located on the shore of Lesser Slave Lake, in Hilliard's Bay Provincial Park, near the town of Grouard in northwestern Alberta.

METHODOLOGY: Portions of two areas of the site were excavated by a crew of 13 students. These areas included an upper bench, where a block of 22 1 x 1 m units was opened, and a lower bench, where three 1 x 1 m units were excavated adjacent to a 1 x 8 m test trench dug in 1980. Excavation proceeded by trowel and followed three natural stratigraphic levels. All artifacts and faunal material were recorded in three dimensions, and all back dirt was sieved through .3 mm (1/4") mesh screens.

Processing and cataloguing of the collection were completed in the field.

RESULTS: The artifacts recovered number 2,930; 738 of these are faunal remains. Most of the lithic component of the assemblage consists of unretouched flakes and shatter, with quartzite being the overwhelmingly preferred raw material (90.3%). Most of this debitage appears to be associated with core reduction. The limited sample of finished tools includes three rather amorphous projectile points and the tip of a fourth, four scrapers, three anvils, and a range of cores, spalls and hammerstones. Only two possible hearth features were found, but these were quite simple, consisting of stains of reddish soil which contained particles of burned and calcined bone. The faunal material is badly fragmented, but examples of woodchuck, dog or coyote, and fish are present.

SITE TYPE: Probably a habitation/quarry-workshop

DATES: Probably last 1,000 years

REPORT: In preparation

88-13

P. T. Bobrowsky
407, 2341 Harbour Road
North Saanich (Sidney)
British Columbia

Caslan and District
Development Assoc.
Campground and Day
Use Area

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area is located on the south shore of Chump Lake, 16 km northeast of the town of Boyle.

METHODOLOGY: Twenty hectares were examined along the south shore of Chump Lake, just northwest of the village of Caslan. Foot traverse of the entire area included visual examination of the exposed ground surface, examination of natural and artificial soil cuts, as well as shovel testing in areas thought to be of high or moderate potential.

RESULTS: A total of 36 test holes was excavated within the proposed impact area. No artifacts, prehistoric or historical sites were found. As a consequence, the development was recommended to proceed as required.

REPORT: In preparation

88-14

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Lo Malta Petroleums
Manyberries Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site is situated in LSD 5-4-5-4-W4M, approximately 16 km east and 5 km south of the village of Manyberries.

METHODOLOGY: The project consisted of a foot traverse survey of two proposed locations for the well site. Because the exact well site boundaries were not finalized at the time of the HRIA, areas of up to 50 m outside of the assumed boundaries were examined. Both well sites were in heavily eroded terrain, precluding the need for shovel testing. In addition to historical resources, a brief search for palaeontological resources was made.

RESULTS: No historical resources sites or palaeontological materials of significance were found within or adjacent to the proposed well site locations.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Oil Wellsite Near Manyberries, Southeastern Alberta ASA Permit 88-14," by Barry J. Dau

88-15

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Fedirchuk McCullough &
Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Gibson Petroleum/Tera
Consultants
Provost Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline, 110 km in length, is located in east-central Alberta. The pipeline lies in the parkland phytogeographic region.

METHODOLOGY: A majority of the proposed right-of-way was examined by a pedestrian traverse. The proposed right-of-way contained copious fortuitous exposures which were examined visually for evidence of prehistoric cultural remains. Shovel tests were excavated in selected areas. Subsurface tests were excavated at identified sites.

RESULTS: Nine prehistoric sites were identified and assessed relative to the development project.

SITE TYPES: Isolated finds (FcOm-1, FcOn-1 and FcOo-3), artifact scatters (FcOo-4 and FcOp-3), campsites (FcOp-1 and 2 and FcOq-11), cairn (FcOp-13)

REPORT: Complete, entitled "Historical Resources Impact Assessment Tera Environmental Consultants (Alta) Ltd. Gibson Petroleum Company Limited, Provost Pipeline Project," by Edward J. McCullough

88-16

Thomas H. Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Golden Properties
Country Residential
Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The project, encompassing approximately 20 ha, is located west of Calgary on a high fluvial terrace on the north side of the Bow River. The area is uncultivated.

METHODOLOGY: The development area was examined on foot, focusing on existing surface exposures. In areas which lacked exposure, shovel testing was undertaken.

RESULTS: No prehistoric materials were identified. A relatively recent historical corral was present but was not felt to be significant.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Bearspaw Village Phase IV," by Thomas H. Head

88-17

Rebecca J. Balcom
Environmental Management Associates
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Calgary, Alberta

Alberta Transportation and Utilities
Peace River Haul Road

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area consists of a bridge across the Peace River and a haul road on the east side. The road is approximately 10 km in length and traverses the valley bottom, coulee bottoms, slopes and upper east terrace.

METHODOLOGY: The project consisted of investigation of the area of the bridge abutment and haul road right-of-way. Approximately half of the right-of-way has been disturbed by tree clearance. All natural and existing exposures were examined in detail. Cutbanks along the Peace River were examined for palaeosols. The objective was not only to inventory and assess sites but to assess the impact of tree clearing.

RESULTS: Two sites were recorded. Site HcQh-11 contained three historical period log structures were located on the lower east terrace of the Peace River. One isolated find, a quartzite flake, was found on the upper terrace some distance from the right-of-way (HcQg-3).

REPORT: Complete, entitled "Historical Resources Impact Mitigation Haul Road and Bridge Approaches Diashowa Pulp Mill Development: Final Report," by Rebecca J. Balcom

88-18

Edward J. McCullough
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304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Alberta Power Limited
DC Converter Station

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed converter station is situated in the Middle Sand Hills area of southeastern Alberta, in the eastern Alberta plains physiographic region.

METHODOLOGY: The proposed development area was examined during foot traverses across the area. Shovel tests, approximately 30 cm in diameter, were excavated within and adjacent to the surficial features observed. Detailed mapping was undertaken subsequent to identification of the site and individual features.

RESULTS: One prehistoric site (EdOm-13) was identified and assessed relative to the development project.

SITE TYPES: Stone circle

REPORT: Complete, entitled "Historical Resources Impact Assessment Alberta Power Limited, McNeill DC Converter Station," by Edward J. McCullough

88-19

Margaret Kennedy
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3, 227 - 14 Street N.W.
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Sexsmith to the Smoky
Historical Society
Subsurface
Architectural Studies

PROJECT TYPE: Excavation research, architectural studies

LOCATION/SETTING: The studies were conducted at the Sexsmith Blacksmith Shop in Sexsmith, Alberta.

METHODOLOGY: The project included investigation of foundation, log coursing, living quarters/shop intersection, door sills, subfloor construction and exterior activity areas by excavation of 30 sq. m.

RESULTS: Exterior activities were obscured by continued deposition of wide variety of materials. Log course number and construction details were recovered. Construction details, based on relative information initial construction methods (e.g., floors not secured to log course), show several constructional periods. Artifacts are dominated by slag, but ceramics were present near door of former living quarters, and coins were present at door of shop.

REPORT: Complete, entitled "Final Report, Archaeological Investigations Sexsmith Blacksmith Shop, Report on Architectural Concerns, ASA Project Number 88-19," by Margaret Kennedy, Stanley Van Dyke and Thomas Head

88-20

Edward J. McCullough
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304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Dome Petroleum
Goodfare Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline is approximately 32 km in length and is located in the Grande Prairie area.

METHODOLOGY: Examination of the entire route involved a pedestrian survey and an intensive visual examination. Subsurface tests were excavated at the proposed crossing of the Beaverlodge River and randomly along the proposed right-of-way.

RESULTS: Two prehistoric sites (GhQu-2, GhQv-1) were identified and assessed relative to the development project.

SITE TYPES: Isolated finds

REPORT: Complete, entitled "Historical Resources Impact Assessment Dome Petroleum Limited, Goodfare Pipeline Project," by Edward J. McCullough

88-21

Heinz W. Pyszczyk
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

City of Edmonton
Pollard Brickyards/ Beddard Tannery

PROJECT TYPE: Mitigation

LOCATION/SETTING: The Pollard Brickyard/Beddard Tanneries (1894-1915) are located along the south bank of the North Saskatchewan River, just west of the High Level Bridge in the city of Edmonton.

METHODOLOGY: Areas along proposed LRT rights-of-way and new roads were shovel tested, and artifacts and faunal samples were recovered. A large refuse pit was excavated by trowel, and all matrix was screened. In addition, artifacts were collected along the banks beneath the site, and large slump blocks from the refuse pit were also sampled.

RESULTS: Archaeological investigations recovered a large artifact and faunal sample from the domestic household refuse pit. This sample will be useful for comparison to other early urban and rural assemblages. A number of architectural features were also exposed and recorded. Recommendations were made to the City of Edmonton to avoid destruction of other significant architectural remains associated with the Pollard Brickyards.

SITE TYPES: Historical industrial site and household

REPORT: In preparation

88-22

Edward J. McCullough
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Calgary, Alberta

French Bay Resort Co.
Cold Lake Resort

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed development area is located on the south shore of Cold Lake in the boreal forest of northeastern Alberta.

METHODOLOGY: The area was examined using pedestrian traverse and excavation of shovel tests focusing on the identified sites of the lodge and ancillary facilities. The trail skirting the lake was also re-examined to reassess the quantity of exposed cultural remains.

RESULTS: One previously recorded site (GcOm-27) was re-examined. This site contains both prehistoric and historical components. The site is the largest, virtually undisturbed site presently known on Cold Lake. It covers an area of 900 x 300 m in its largest dimensions. The identifiable prehistoric component is a McKean campsite; the historical component is associated with a N.W.M.P. camp of the Riel Rebellion and the logging operations of the early 20th century Haywards and Edwards.

SITE TYPE: Prehistoric - campsite
Historical - N.W.M.P. camp, logging camp

DATES: Prehistoric - McKean
Historical - 19th and 20th centuries

REPORT: Complete, entitled "Historical Resources Impact Assessment French Bay Resort Company Ltd. French Bay Resort, Cold Lake, Alberta," by Edward J. McCullough and Gloria J. Fedirchuk

88-23

Glenn S. L. Stuart
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304, 1725 - 10 Avenue S.W.
Calgary, Alberta

NOVA Corporation
Milo Lateral Loop

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed right-of-way is approximately 40 km long and is located in mixed prairie region of southeastern Alberta.

METHODOLOGY: The location and contents of the previously recorded sites within or immediately adjacent to the proposed additional right-of-way were revisited and verified in order to determine if the proposed development would impact the sites. In addition, the new right-of-way which did not parallel the existing pipeline was examined. A pedestrian traverse of the entire 3 km of new right-of-way was conducted. All fortuitous exposures were examined visually for evidence of prehistoric cultural materials. Subsurface tests were excavated at features/sites which would be impacted by the proposed development.

RESULTS: Nine previously recorded and two new prehistoric sites (EdPc-110 and EdPd-21) were identified.

SITE TYPES: Stone features (EcPb-18, EcPc-71 and 72, EdPc-67 and 68, EdPd-16 to 19 and EdPc-100), artifact scatter (EdPd-21)

REPORT: Complete, entitled "1988 Historical Resources Impact Assessment Nova Corporation of Alberta, Milo Lateral Loop Project, Flowline Replacements - 1988, Nova Corporation of Alberta, Milo Lateral Loop Project," by G. S. L. Stuart

88-24

John H. Brumley
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Trimble Resources Ltd.
Manyberries Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site is located in LSD-6-33-1-5-4 on essentially level, prairie grassland. Terrain within the general project area is quite rugged, with numerous, deeply eroded coulee systems eroding the prairie surface. Surficial deposits on the prairie surface consist of unsorted or poorly sorted stoney glacial till, while on the eroded coulee walls, exposed shale and soft sandstone bedrock of cretaceous age can be found.

METHODOLOGY: Examination of the well site and connecting access road right-of-way involved walking a series of traverses back and forth across the entire surface and their margins. Individual traverses were spaced no more than 5 m apart. Existing subsurface exposures were numerous throughout proposed development areas and consisted of deflation surfaces eroded from 30-40 cm below the undisturbed surface exposing basal glacial tills.

RESULTS: Examination of the proposed well site and connecting access road resulted in the discovery of a single archaeological site (DgOp-40). The site, consisting of at least 32 stone circles, a fire-cracked rock feature and a thin scattering of cultural debris, clearly reflects an aboriginal campsite of unknown age and cultural association. The access road was relocated and now totally avoids the site area. No further mitigative action is considered necessary or is recommended.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Wellsite Near Manyberries, Southeastern Alberta, ASA Permit 88-24," by John H. Brumley

88-25

Gerald A. Oetelaar
Dept. of Archaeology
University of Calgary
Calgary, Alberta

University of Calgary
Strathcona Site

PROJECT TYPE: Research/archaeology field school

LOCATION/SETTING: The site is located on the east side of the North Saskatchewan River, in the county of Strathcona, near the eastern limits of the city of Edmonton.

METHODOLOGY: Excavations at the Strathcona site during the 1988 field season were designed to investigate, in more detail, the nature of the hypothesized domestic occupation. The prime objective of the field work was to evaluate hypotheses formulated during the 1986 and 1987 field seasons by examining a different portion of the site. The area selected for excavation included 33 contiguous 1 x 1 m units in the vicinity of 400 m north and 170 m east on the site wide grid. Excavation was done by hand with trowels. All matrix removed from the units was sieved through 1/4 inch screens. In addition, small bulk samples were removed from the northeast corners of the units for later processing.

RESULTS: Over 10,000 items were recovered from the 33 units excavated. Over 80% of the recovered material consisted of lithic debitage, with only minor quantities of bone, fire-broken rock and Euro-Canadian goods. Diagnostic artifacts include one complete Besant side-notched point, one complete Avonlea point (variety Timber Ridge side-notched) and one Plains Side-notched point. Other flaked stone tools in the 1988 assemblage include thumbnail scrapers, large end and sidescrapers, crude bifaces or preforms, spokeshaves and a variety of edge modified flakes.

SITE TYPE: Habitation site and possible lithic workshop

CULTURAL AFFILIATION: Middle and Late Prehistoric

DATES: From contact through to ca. 4,000 or 5,000 years BP, based on radiocarbon dates and projectile point typology.

REPORT: Complete, entitled "Final Report of the 1988 University of Calgary Archaeology Field School at the Strathcona Site (FjPi-29)," by Gerald A. Oetelaar

88-26	**B. O. K. Reeves** **56, 1815 Varsity Estates Drive N.W.** **Calgary, Alberta**	**Shell Canada Limited** **Sorge Pipeline Project**

PROJECT TYPE: HRIA

LOCATION/SETTING: The pipeline route is located in the foothills of southwestern Alberta, southwest of the town of Pincher Creek. The terrain crossed varies from gently to steeply rolling. One small stream and one major stream are crossed, and the edges of Daigle and Fish lakes are paralleled along sections of the route. Vegetation varies from aspen-covered woodlands, through natural foothills grassland, to cleared, cultivated or pasture lands.

METHODOLOGY: Portions of the proposed pipeline route, which traversed areas of high historical resource potential (stream crossings, lake edges, high ridges, spring lines and terraces) were walked, and available exposures were examined for evidence of prehistoric archaeological or historical sites. Exposures consisted of cultivated lands, cleared tracks and trails, natural rodent mounts, cattle and game trails, stream cuts and other disturbances. Subsurface visibility varied from good to excellent.

RESULTS: No historical resources were found along the pipeline route.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Shell Canada Limited Sorge Pipeline Project (ASA Permit 88-26)," by B. O. K. Reeves

88-27	**Thomas H. Head** **Bison Historical Services** **3, 227 - 14 Street N.W.** **Calgary, Alberta**	**Alberta Transportation and Utilities/Alberta Recreation and Parks Parks /Transportation Projects**

PROJECT TYPE: HRIA

LOCATION/SETTING: A number of northern projects were examined, including improvements to a provincial park near

Hinton, gravel pits near Nordegg, Edson, Odeb and Lac La Biche, and road alignments near Drayton Valley and Erskine.

METHODOLOGY: The areas were examined on foot, focusing on existing surface exposures. Shovel tests were undertaken in areas that lacked exposure.

RESULTS: No historical resource sites were identified on three of the projects: the gravel pits near Obed and Lac La Biche and the road alignment near Drayton Valley. Three prehistoric sites (FiQk-26 to 28) were identified in William Switzer Provincial Park. Only FiQk-28 warranted additional work because of its significance and the threat of impact. Two fished tailed points and a number of other tools were recovered from this site. Additional work on this site was recommended. Three prehistoric sites (FjQc-4 to 6) were identified at the Palansky Pit near Edson. Shovel testing at FjQc-5 resulted in the recovery of 93 lithic items from a single shovel test. Additional work on this site was recommended. A single prehistoric site (FbPx-1) was identified at the Meadows Pit south and west of Nordegg. It is within the reserve for the pit but just outside the area scheduled for direct impact at this time. Additional work is recommended should expansion of the pit be anticipated. Work on SR 835 near Erskine resulted in the identification of five prehistoric sites (FbPf-4 to 8). Materials from FbPf-4 include a "Pelican Lake" point, biface fragments and endscrapers. Five shovel tests in this cultivated field contained cultural material. Additional work on this site was recommended prior to road construction.

REPORT: Complete, entitled "Historical Resources Impact Assessment 1988 Transportation and Parks Developments, Northern Alberta: Final Report," by Thomas Head

88-28

J. Roderick Vickers
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Alberta Recreation and Parks
Writing-On-Stone Provincial Park
Maintenance Yard and Admin. Complex

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area is situated on prairie level on the north side of Milk River in Writing-On-Stone Provincial Park, southern Alberta.

METHODOLOGY: File searches, foot traverses and screened shovel tests were conducted.

RESULTS: Examination of the development areas and excavation of 11 shovel tests failed to reveal any cultural material. Consultation with local amateur archaeologists confirmed that no sites had been previously noted in the development areas.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Writing-On-Stone Provincial Park Maintenance Yard and Administration Complex," by J. Roderick Vickers

88-29

J. Rod Vickers
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Alberta Culture and Multiculturalism
Fletcher Site Research

PROJECT TYPE: Research excavation

LOCATION/SETTING: The Fletcher site is located on prairie level on the north side of Chin Coulee in southern Alberta.

METHODOLOGY: One 2 x 2 m unit, situated on the south edge of a dugout at approximately the highest point was, excavated by shovel shaving on 10 cm arbitrary and natural levels to 2 m below surface under permit 87-55. The unit was sealed and excavation continued in 1988. (Reporting obligations for permit 87-55 have been assumed under permit 88-29). Work included removal of the Cody horizon from the south half of the unit, removal of a soil column to be analyzed by M. Wilson, extraction of further palaeomagnetic samples by R. Barendregt, removal of matrix for pollen analysis by A. Beaudoin, and further sampling of the clay/plant macrofossil layer underlying the Cody bone bed. Preliminary results and planned research are discussed more fully in Wilson et al. (this volume).

RESULTS: Excavation of the test unit is complete. Analysis of material is ongoing.

SITE TYPES: Buried camp/kill

REPORT: Reporting obligations for permit 87-55 will be incorporated with those for permit 88-29.

88-30 **Cancelled**

88-31	**Eugene M. Gryba** **3, 346 - 4th Avenue N.E.** **Calgary, Alberta**	**Lakeview Resort/RV Park Ltd.** **Recreational Vehicle Park/Lake McGregor Reservoir**

PROJECT TYPE: HRIA

LOCATION/SETTING: The project was located in shortgrass plains environment on the west side of McGregor Lake, 30 km east of Vulcan. The terrain included meltwater channel floor, west valley side and prairie level. The western part of the subdivision has been impacted by cultivation. Little post-glacial deposition is present at prairie level.

METHODOLOGY: Survey included foot traverse and visual inspection, followed by limited shovel testing.

RESULTS: Four new sites (EcPf-6 to 9) were recorded. All four sites occur along the valley rim and can be avoided by planned development.

SITE TYPES: Site EcPf-6 consists of two scattered stone rings and possible associated cairn; the others are made up of stone cairns.

REPORT: Complete, entitled "Historical Resources Impact Assessment of a Proposed Recreation Development of SW 16-16-21-W4 near Lake McGregor in Southwestern Alberta," by Eugene M. Gryba

88-32

Thomas H. Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Alberta Transportation and Utilities Gravel Pit

PROJECT TYPE: HRIA

LOCATION/SETTING: This project involved the examination of an aggregate access road near Fort McKay, as well as the assessment of impact by the winter construction to the Cree Burn Lake site (HhOv-16). Areas examined were located on the east side of the Athabasca River on high sand ridges.

METHODOLOGY: Extensive shovel testing was undertaken in areas scheduled for impact and adjacent to areas already impacted. Much of this work was focused near site HhOv-16 in an attempt to identify locales which might be stratified. On the basis of the preliminary work, 22 sq. m were excavated in four separate locales.

RESULTS: Excavations resulted in the recovery of over 10,000 lithic items. The vast majority of this material is the ubiquitous Beaver River Sandstone. Unfortunately, no diagnostic artifacts were located. Two of the four areas examined contained stratified sediments, but only one contained stratified cultural materials. A number of finished tools have been submitted for blood residue analysis. If residues are identified, they will be submitted for AMS dating.

REPORT: In preparation

88-33

Eugene M. Gryba
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Calgary, Alberta

Alberta Transportation and Utilities/Alberta Recreation and Parks Gravel Pits, Highway and Park Developments

PROJECT TYPE: HRIA

LOCATION/SETTING: The various projects were distributed throughout southern Alberta, from the Battle River near Camrose to Cypress Hills Provincial Park south of

Medicine Hat and Police Outpost Provincial Park southwest of Cardston.

METHODOLOGY: Foot traverse and visual inspection were followed by shovel testing of identified sites and in areas of archaeological potential. No shovel testing was undertaken at the proposed Horner Gravel Pit where an extensive occurrence of stone features and other prehistoric remains were discovered within Bullpound Creek valley southeast of Hanna.

RESULTS: Twenty previously unreported sites (DkOn-18 and 19, DgPk-90 and 91, EbOs-60 to 68, EhOx-7 to 11, ElPb-3 to 7 and FfPf-1 to 3) were recorded. Mitigative work was carried out at sites EbOs-61 to 68 by Environmental Management Associates Ltd. (permit 88-55) and at ElPb-3 by James Light (permit 88-76).

SITE TYPES: Sites DkOn-18, DgPk-90 and 91, EbOs-65, 67 and 68, EhOx-7, 8 and 9 and ElPb-3 and 6 are represented by tipi rings or stone circles. Sites EbOs-61 to 64, 67 and 68 and ElPb-4 to 7 contain stone cairns. Site EbOs-66 is a possible boulder effigy, while sites DkOn-19, EbOs-60, EhOx-10 and 11 and FfPf-1, 2 and 3 are surface or buried occurrences of archaeological remains. Small, corner-removed and unnotched triangular points were found at EhOx-10.

REPORT: Complete, entitled "Historical Resources Impact Assessment of a Number of Proposed Highway Construction Projects, Gravel Pit Developments, and Park Improvement Projects throughout Southern Alberta," by Eugene M. Gryba

88-34

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Alberta Environment
Oldman River Dam
Stone Features
Component

PROJECT TYPE: Mitigation

LOCATION/SETTING: The sites examined during the 1988 Stone Features Component are within and immediately adjacent to the Oldman River Dam Reservoir north of Pincher Creek.

METHODOLOGY: The purpose of the 1988 Stone Features Component was to examine a sample of surface stone features sites to be impacted by the construction of the Oldman River Dam. Nineteen sites (DjPl-6, 23, 24 and 26, DjPm-21, 40, 43, 76, 115, 128, 143, 149, 156, 197, 207, 213, 214 and 218) were selected for work in 1988. Basic structural information was collected from 168 stone circles, 11 unassociated cairns, 11 stone alignments and one possible effigy. A total of 1,329 auger holes was drilled within and adjacent to 157 stone circles. An area of 419.57 sq. m was excavated within and adjacent to 17 stone circles, 10 cairns in six stone alignments and one buried camp. In addition, controlled stripping encompassed 1,520 sq. m outside but adjacent to 16 stone circles.

RESULTS: During 1988, 5,843 cultural items were identified. The vast majority are cultural stones, fire-cracked rocks and bones. Very few cultural diagnostics were found.

CULTURAL AFFILIATION: The few diagnostics found consist of projectile points and European trade goods. They indicate that the examined sites were occupied from the Besant Phase of the Late Middle Prehistoric Period to the protohistoric/ historical times.

REPORT: Complete, entitled "1988 Oldman River Dam Prehistoric Archaeology Mitigation Program: Stone Features Component. ASA Permit 88-34," by Barry J. Dau

88-35C and 88-69C	**Edward J. McCullough Glenn S. L. Stuart Fedirchuk McCullough & Associates Ltd. 304, 1725 - 10 Avenue S.W. Calgary, Alberta**	**Alberta Culture and Multiculturalism/ Alberta Transportation and Utilities Stratton Peake Site Excavation**

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: EgOx-34, the Stratton Peake site, is situated in the grasslands of southeastern Alberta, approximately 12 km east of the hamlet of Finnegan. The site lies on a series of low terraces at the confluence of a tributary and Bullpound Creek.

METHODOLOGY: Eight stone circles were identified on the upper terraces, and seven stone circles were identified on the lower terraces. Cultural material, exposed by deflation, was observed primarily on the lower terrace. One stone circle on the upper terrace and two stone circles on the lower terrace were completely excavated. In addition, four stone circles on the upper terrace were tested, and block excavations in the vicinity of stone circles 1 and 2 on the lower terrace were conducted. A total of 130 sq. m was excavated to an average depth of 20 cm below surface.

One historical and two prehistoric components were readily identifiable in the field. The historical component consists of metal fragments and a 19th century button. The upper prehistoric component is associated with the visible stone circles. The lower prehistoric component was clearly separated from the upper level by sterile soil approximately 5-7 cm thick. A number of stone "features" were encountered and mapped.

Technological and raw material analyses are being undertaken on the lithic remains to ascertain variations in technology and the types of materials used, both from ring to ring and between components. Vertical and horizontal distributional studies, plus conjoinability and provenience studies, are also being undertaken to determine if vertical and lateral distinctions in the artifact assemblages can be made. The recorded weight of the individual ring rocks and the relative distribution of weight of the ring rocks in each of the stone circles will be analyzed and compared to determine if all of the stone circles excavated were occupied during the same season. Protein residue studies will be conducted on a sample of finished tools to provide a basis for information on faunal use and possible tool function. Radiocarbon analysis of bone is being undertaken to date times of occupation more precisely.

RESULTS: To date, only the field component of the project has been completed. Eight projectile points were identified during the excavations. All are Late Prehistoric, small, side-notched forms.

DATES: Absolute dates are as yet unavailable; however, on the basis of field identification of projectile points forms, both components are Late Prehistoric.

REPORT: Complete, entitled "The Stratton Peake Site, EgOx-34, A Multicomponent Stone Circle Site on Bullpound Creek," by Glenn S. L. Stuart

88-36

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Chevron Resources
Medicine River Gas
Conservation Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline is approximately 65 km in length and is located in west central Alberta.

METHODOLOGY: A record review of site files was conducted to identify previously recorded portions of the proposed development zone. Previously assessed portions of the proposed right-of-way were revisited and reassessed relative to potential impacts from the proposed development. Ground reconnaissance of all medium to high potential areas, as well as reassessment of previously recorded sites along the proposed route, were undertaken. This included an intensive visual examination of all exposures within the proposed right-of-way. Shovel tests were excavated in areas lacking suitable exposures. Subsurface testing was also conducted in order to evaluate site content and significance.

RESULTS: Eight previously recorded and eight new prehistoric sites were identified during the ground reconnaissance.

SITE TYPES: Isolated finds (FcPn-10, FdPn-2, FePm-2, FcPo-4 and 6, FdPn-9 and 11, FePm-7) and campsites (FdPn-3, FePm-3 to 5, FcPo-5, FdPn-10 and 12)

REPORT: Complete, entitled "1988 Historical Resources Impact Assessment Chevron Canada Resources. Medicine River Gas Conservation Project," by Edward J. McCullough

88-37

John H. Brumley
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Alberta Environment/
Alberta Public Works
Supply and Services
Oldman River Dam

PROJECT TYPE: Management of the various mitigation components of the Oldman River Dam development.

METHODOLOGY: The management component during 1988 involved the following activities:
(1) development of a standardized series of field and analysis procedures to be employed by the field researchers;
(2) co-ordination of the day-to-day activities of the various field components with one another and with construction activities;
(3) accumulation of ancillary study data to be used by John Brumley in the overall project synthesis studies to be completed at the end of the field program; and
(4) synthesis of the recommendations of the individual field component directors and development of a research design for the 1989 field season.

REPORT: Complete, a field and laboratory procedures manual, entitled "Oldman River Dam Archaeological Project: Defined Procedural Requirements," by John H. Brumley. An edited volume drawing together the field reports from the 1988 program is in preparation.

88-38

Alison Landals
Environmental
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Alberta Environment
Oldman River Dam

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area is located along the Crowsnest, Castle and Oldman river valleys in southern Alberta, in the reservoir area of the Oldman River Dam.

METHODOLOGY: The project consisted of two segments: assessment of 14 archaeological sites previously identified as bison kills (DjPm-41, 80, 88, 89, 100, 102, 114, 116, 122, 126, 222, 223, 225 and 227) and an exploratory backhoe assessment program designed to test numerous potential kill locales and various deeply buried deposits.

RESULTS: Excavations revealed a range of site types, primarily related to bison kill/processing activities. Cultural material in some sites consisted of sparse scatters of butchered bone, ranging in other sites (e.g., DjPm-80, 116 and 126) to dense bone bed deposits. Identified components are primarily Late Prehistoric in cultural affiliation, although several Pelican Lake components were also defined. The backhoe program allowed the identification of seven new historical resource sites and the re-assessment of some previously identified sites.

SITE TYPES: Bison jumps, natural traps, small-scale hunting sites, processing sites, campsites and buried stone circles

REPORT: 1988 Oldman River Dam Prehistoric Archaeology Mitigation Program Kill Sites Component ASA Permit 88-38 Final Report, by Alison Landals

88-39

Stanley Van Dyke
Bison Historical Services
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Alberta Environment
Oldman River Dam

PROJECT TYPE: Mitigation

LOCATION/SETTING: Work was conducted at the Oldman, Castle and Crowsnest river confluences and valleys near Pincher Creek.

METHODOLOGY: Seventy backhoe tests were dug on 14 prehistoric sites to identify and/or delineate cultural deposits. Test excavations were performed on prehistoric sites DjPl-3, 11, 13 and 100, DjPm-16, 44, 60, 66, 79, 84, 98, 100, 102, 145, 151, 198, 204 and 228. Extensive testing was done on DjPm-36.

RESULTS: A total of 425 sq. m was excavated. Artifacts, including debitage (n=10,000), tools (ca. 1,000), fire-broken and unmodified stone (n=10,000) and bone (ca. 30,000), were recovered from 87 stratified components at 15 of 23 sites investigated.

SITE TYPES: Surface stone circles (DjPm-44 and 100), buried living floors, probably stone circles, with hearths, boiling pits and other features (DjPl-3, 11, 13 and 100, DjPm-36, 44, 79, 98, 100, 198 and 228), campsite deposits (DjPm-16), processing campsites (DjPm-84, 100 and 204), rock shelter (DjPl-3)

CULTURAL AFFILIATION: DjPm-100 and DjPl-100 - protohistoric, DjPl-11 and DjPl-13, DjPm-36 and 44 - Besant. DjPl-11 - Hanna, DjPm-16 and 36 - Early Middle Prehistoric. Netsinkers, unrelated to the traditional Plains sequence, were recovered from four of the prehistoric sites (DjPl-3, 11, 13 and 100). Their age is estimated to be 1,800 to 2,200 years.

REPORT: Complete, entitled "Section 3.0 1988 Oldman River Dam Prehistoric Archaeological Mitigation Program - Campsites Component, ASA Permit 88-39 Final Report," by Stanley Van Dyke, Thomas Head and Barb Neal

88-40

Lynda Gullason
Dept. of Anthropology
University of Alberta
Edmonton, Alberta

University of Alberta
Buckingham House/
Fort George

PROJECT TYPE: Graduate student research

LOCATION/SETTING: The Fort George-Buckingham House site complex is located southeast of Elk Point in the boreal/parkland transition. The area lies in an undisturbed, secondary growth of deciduous trees and bushes.

METHODOLOGY: The area was cleared of underbrush, and shovel tests were dug at 10 m intervals. Where cultural material was observed on the surface, additional larger units were excavated and expanded as necessary.

RESULTS: Isolated finds were recovered. A large, two-room building containing both European and native artifacts, was completely excavated.

SITE TYPE: Historical building contemporaneous with Fort George and Buckingham House (1792-1800)

REPORT: Thesis in preparation, to be entitled "The Fort George Plantation: Contact and Culture Change in the Fur Trade," by Lynda Gullason

88-41

Thomas H. Head
Bison Historical Services
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NOVA Corporation
Sullivan Lake Lateral
Loop Extension

PROJECT TYPE: HRIA

LOCATION/SETTING: This project is located south and east of Endiang, Alberta and west of the Sullivan Lake Basin, in an area of hummocky ground moraine.

METHODOLOGY: The project paralleled existing lines and required an additional 7 m of right-of-way along its 9.4 km length. The entire alignment was examined, and shovel testing was undertaken at various locales.

RESULTS: One historical site and seven prehistoric sites (ElPa-1 to 7) were identified. All of the sites - with the exception of ElPa-1 (Scapa Ribstone) and the historical site - were associated with cultivated areas and were felt to be of low significance. The historical site, a homestead, was located outside the zone of impact, so additional work was not recommended. Direct impact was anticipated at the Scapa Ribstone (ElPa-1). Shovel testing revealed the presence of undisturbed cultural material in three separate areas. Additional work was recommended if avoidance was not possible.

REPORT: Complete, entitled "Historical Resources Impact Assessment NPS 6; Sullivan Lake Lateral Extension," by Thomas H. Head

88-42

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Shell Canada
Resources
Whitney Creek Well
Site and Access Road

PROJECT TYPE: HRIA

LOCATION/SETTING: The project is located on the northeast side of Prairie Bluff. It lies within the subalpine life zone. The access road will follow an abandoned logging trail, ascending Whitney Creek, and crossing over a series of well-developed outwash terraces. In the lower reaches, it is characterized by a series of small open meadows, while the upper reaches of the trail and the well site are located in subalpine coniferous forests.

METHODOLOGY: The route was walked, and exposures and disturbed areas were examined for evidence of historical resource sites.

RESULTS: No sites were found. No structural remains or other features of historical interest relating to the logging activities were found. No further studies are recommended.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Shell Canada Resources Ltd. Shell Waterton Field Whitney Creek Well and Access Road," by Brian Reeves

88-43

Milt Wright
Archaeological Survey
of Alberta
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Edmonton, Alberta

Alberta Culture and
Multiculturalism
Birch Hills Survey and
Testing Program

PROJECT TYPE: First Albertans Research Project

LOCATION/SETTING: Research was conducted in the Peace River district, specifically on the slopes of the Birch Hills - a cuesta formation with glacial lake features/strandlines. Survey was concentrated along strandline terrace features with known assemblages of early prehistoric point styles.

METHODOLOGY: Cultivated portions of the glacial lake terraces were walked and adjacent, non-cultivated wood lot areas were shovel tested to evaluate subsurface matrices. Surface collection was restricted to diagnostic pieces in cultivated areas. Mapping was conducted on the beach/terrace formations to determine if the assemblages of artifacts from this region could be correlated by beach ridge chronology.

RESULTS: Severe weather conditions reduced the survey to non-flooded zones. Insufficient data are available to assess beach/artifact assemblage correlations. Three prehistoric sites revealed a microblade core, fluted points and a series of plano point varieties.

SITE TYPES: Multicomponent, prehistoric campsites

REPORT: In preparation

88-44

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NOVA Corporation
Coates Lake Lateral Pipeline and Meter Station

PROJECT TYPE: HRIA

LOCATION/SETTING: The pipeline is 27.8 km in length and is located 27 km northeast of Oyen. The pipeline traverses flat to gently rolling terrain, most of which is cultivated.

METHODOLOGY: The entire pipeline was walked and examined visually. Shovel tests were excavated as appropriate.

RESULTS: Two sites (EkOm-2 and 3) were recorded.

SITE TYPES: EkOm-2: lithic scatter
EkOm-3: historical period debris scatter

CULTURAL AFFILIATION: Duncan and Hanna projectile points were found at EkOm-2.

REPORT: Complete, entitled "Historical Resources Impact Assessment Nova-Coates Lake Pipeline Near Oyen Final Report, Permit 88-44," by Rebecca J. Balcom

88-45

Gloria J. Fedirchuk
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Gordon Atkins and Associates
Cullen Creek Phase II Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed subdivision investigated under this permit is located immediately west of Calgary. Cullen Creek flows along the western border of the development area.

METHODOLOGY: All fortuitous exposures were examined during foot traverses across the area. Subsurface tests were excavated at identified sites.

RESULTS: Three small, prehistoric sites (EgPn-321 to 323) were identified.

SITE TYPES: Campsites: EgPn-321 and 322
Isolated find: EgPn-323

REPORT: Complete, entitled "1988 Historical Resources Impact Assessment Gordon Atkins & Associates Architects Ltd. Cullen Creek Phase II Subdivision," by Gloria J. Fedirchuk

88-46

Heinz Pyszczyk
Archaeological Survey of Alberta
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Alberta Culture and Multiculturalism
Lac La Biche Oblate Mission

PROJECT TYPE: Mitigation

LOCATION/SETTING: The Lac La Biche Oblate Mission (GePa-30) is located on the west side of Lac La Biche, approximately 10 km north west of the town of Lac La Biche.

METHODOLOGY: During the spring, all visible artifacts and faunal remains were collected along the mission beach front and lake shallows. The material has been stored and will be catalogued and analyzed. Historically significant pieces may be used for restoration/display purposes.

RESULTS: A considerable number of artifacts and faunal remains, representing the Oblate occupation of this mission, were recovered. The project was intended to collect potentially valuable artifacts before they were covered with higher water levels in the future.

SITE TYPE: Historical mission

REPORT: In preparation

88-47	**Eric Damkjar** **E.R.D. Heritage Consulting** **7701 - 86 Avenue** **Edmonton, Alberta**	**NOVA Corporation of Alberta** **Huallen Lateral Pipeline**

PROJECT TYPE: HRIA

LOCATION/SETTING: Located approximately 40 km west of Grande Prairie, near the town of Beaverlodge, the 25 m wide pipeline right-of-way runs generally north-south for about 28 km, passing over gently rolling, mostly cultivated land and crossing the Beaverlodge and Redwillow rivers.

METHODOLOGY: The entire route was traversed on foot. The surface, as well as natural and man-made subsurface exposures, were examined, and judgmentally placed shovel tests were made where appropriate.

RESULTS: Three prehistoric sites were located. GhQu-3 yielded five unifaces, eight miscellaneous lithic fragments, one hammerstone and one (*Bison* ?) bone. GgQu-2 yielded one (Besant?) projectile point, one uniface, six miscellaneous lithic fragments, one core, and eight (*Bison* ?) bones. GgQu-3, situated 400 m west of the right-of-way, consisted of a single endscraper. Two historical sites, a farm building and a small-scale coal mining operation (GgQu-4), were also found.

SITE TYPES: Two campsites, one isolated find, one farm building and one coal mine

REPORT: Complete, entitled "Historical Resources Impact Assessment, NOVA Corporation of Alberta, Huallen Lateral Pipeline, Townships 69-72, Ranges 9-10, W6M, Permit No. 88-47," by Eric Damkjar

88-48

Michael Forsman
Archaeological Survey of Alberta
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Edmonton, Alberta

Alberta Culture and Multiculturalism
Fort Chipewyan III

PROJECT TYPE: Continuing research and resource management excavations at Fort Chipewyan III

LOCATION/SETTING: The fort is located on the western shore of Lake Athabasca.

METHODOLOGY: Shovel and trowel excavation were conducted in palisade areas; test excavation by strata was done in the midden area.

RESULTS: Portions of palisades were exposed and recorded. Excavations in the north midden exposed stratified deposits with some disturbance.

REPORT: In preparation, to include previous results

88-49

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Alberta Transportation and Utilities
Highway and Gravel Pit Developments

PROJECT TYPE: HRIA

LOCATION/SETTING: FjQc-5, located in the hills above the McLeod River near the town of Edson, will be affected by the removal of aggregate material . The site is on the tip of a sand esker in an area of aspen forest.

METHODOLOGY: A shovel test program was used to determine the areas of maximum artifact concentration. Forty shovel tests were placed on a 10 m grid. Based on the results of this testing, 18 units were excavated to an average depth of 15 cm below surface.

RESULTS: No diagnostic artifacts were recovered from FjQc-5. Although several hundred flakes were recovered, most seem to have originated from only a few quartzite cores. Tools recovery was minimal. Examination of the unit profiles led the author to discussions with the landowner who indicated that the site area had been disturbed during clearing of forest cover to create a ski hill. It is likely that of the three block excavations undertaken, only Block A was undisturbed.

SITE TYPE: FjQc-5 seems to be a primary resource utilization site where quartzite cobbles from the nearby McLeod River were processed. The site is a good vantage point and may have served as a hunting lookout as well. Because of the disturbance to the area, it is not possible to be certain of the site type.

REPORT: Complete, entitled "Excavations at FjQc-5 Mitigation of the Palanski Borrow Pit: Final Report," by James Light

88-50

Richard Callaghan
ARESCO Ltd.
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Genstar Development Company
Calgary Housing Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The 480 acre subdivision is located in south Calgary, south of Fish Creek and west of the Bow River. The area had been cultivated, and some trees had been removed.

METHODOLOGY: Foot traverses and subsurface testing by shovel and backhoe were performed as necessary.

RESULTS: Six sites were located. A broken projectile point, with characteristics similar to Irvine points found elsewhere, was recovered. No other time diagnostic materials were obtained, but all sites are presumed to be prehistoric in age.

REPORT: Complete, entitled "Historical Resources Impact Assessment, Lake Chaparral Subdivision, Calgary, Alberta, Parts of S23 and S22/22/1/W5M, Final Report, Permit 88-50," by Richard Callaghan and Colin Poole

88-51

Heinz Pyszczyk
Archaeological Survey of Alberta
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Alberta Culture and Multiculturalism
Fort Vermilion Archaeological Survey and Excavation

PROJECT TYPE: Research

LOCATION/SETTING: Lands were surveyed adjacent to the Boyer River in the Fort Vermilion region. The fur trade site (IcPx-16) is located near the mouth of the Boyer and Peace rivers.

METHODOLOGY: Foot traverse, site recording and mapping were conducted. Diagnostic artifacts were collected from sites. Approximately 10 sq. m of the Boyer River fur trade site were excavated by shovel and trowel, and all matrix was screened. All historical features were recorded, and all artifacts and faunal remains were collected.

RESULTS: The archaeological survey located a few additional prehistoric sites in the region, and Middle to Late prehistoric notched and stemmed bifaces were recovered. A microblade core was also recovered from one prehistoric site.

Archaeological investigations of the Boyer River post yielded building construction details and artifacts that indicate it is an early (late 18th - early 19th century) fur trade site. Remains are similar to other North West Company remains found in the province. This could be the 1788 North West Company Boyer's Post.

SITE TYPES: Prehistoric sites, historical fur trade post

REPORT: In preparation

88-52

James A. Light
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NOVA Corporation
Morrin Lateral
Loop No. 2

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed development will affect about 32 ha of land adjacent to the previously developed Phase 1. The development is located in SE-2-25-3-W5M. This site is just west of the city of Calgary, on the south rim of the Bow River valley.

METHODOLOGY: The proposed pipeline parallels existing lines and utilizes their corridor to some extent. Because five archaeological sites were known to be in proximity to the proposed line and because previous archaeological work had been done under winter conditions, a complete assessment was required. The entire pipeline was walked, and shovel tests were excavated in areas with medium to high potential for buried archaeological material.

RESULTS: Seven new archaeological sites (EjPf-41, EjPe-7 to 11 and EjPd-10) were identified during the present work. All were small finds, either isolated finds or lithic scatters of less than five items. No further work is recommended on any of the sites. One of the previously recorded sites (EjPf-13) will also suffer impacts. This site was surface collected during the assessment, and no further work is recommended.

REPORT: Complete, entitled "Historical Resources Impact Assessment of NOVA Corporation's Morrin Lateral Loop Number Two Final Report, Permit 88-52," by James A. Light

88-53

Michael Clayton Wilson
Dept. of Geography
University of Lethbridge
Lethbridge, Alberta

Social Sciences and Humanities Research Council of Canada
Fletcher Site

PROJECT TYPE: Research

LOCATION/SETTING: The Fletcher site (DjOw-1) is located approximately 50 km SSE of Taber, on the north side of Chin Coulee.

METHODOLOGY: Funds have been provided to establish a database of all existing records concerning the site, to bring previous researchers back to the site for interviews, and to undertake a coring program to help delimit the site and understand its stratigraphic setting. Truck-mounted and trainer-mounted coring devices will be tested to determine the most efficient procedures and machinery.

RESULTS: Delayed announcement of SSHRC funding made a spring, 1988 start impossible. The drilling project was deferred pending the permit holder's field work in the People's Republic of China (summer,

1988) and a fall meeting with staff of the Archaeological Survey of Alberta. Nevertheless, visits were made to the site in the fall of 1988 to examine surface features. A visit subsequent to an ASA-monitored "mucking out" operation for enhancement of springflow resulted in collection of two Scottsbluff projectile points, a biface, a chopper and several important bone specimens, including a partial bison calf skull and mandibles. Amateur archaeologists had already collected other material, including at least one projectile point.

Efforts by Ian G. Robertson have resulted in an extensive and still growing database that included transcriptions of field notes from the early field seasons. In addition, computer topographic maps have been generated from survey data collected by Brian O. K. Reeves (1964) and by M. C. Wilson and A. C. MacWilliams (1986).

A cooperative program directed by M. C. Wilson (University of Lethbridge) and J. R. Vickers (ASA) and involving specialists from these and other institutions has been agreed upon. It has been agreed that a research design for the site should allow for work over a period of decades rather than a few years and that expanded excavations are not the highest priority. The immediate goal is a summary of available information about the site, including geomorphological, stratigraphic, pedological and palaeoenvironmental studies as well as full descriptive and analytic studies of the artifacts and bones.

Coring will be undertaken for stratigraphic and palaeoenvironmental sampling in the spring of 1989.

SITE TYPE: Palaeo-Indian bison kill (Alberta/Scottsbluff)

REPORT: In preparation

88-54	**John Brumley** **Ethos Consultants Ltd.** **Box 20, Route 5** **Medicine Hat, Alberta**	**South Eastern Alberta Archaeological Society Test Excavations at EaQq-43**

PROJECT TYPE: Research

LOCATION/SETTING: Site EaQq-43 is situated on the floor of a small coulee on the northwest margins of Medicine Hat and approximately 1 km south of the South Saskatchewan River.

METHODOLOGY: EaQq-43, as originally found, consisted of a considerable quantity of bison bone on the surface of a cultivated field in the coulee bottom. A series of excavated test units and backhoe pits were excavated within and adjacent to the bone exposure intended to accomplish the following:
(1) determine the nature and extent of deposits present;
(2) if the site represents a communal bison kill, determine the kill type; and
(3) recover sufficient quantities of faunal remains and cultural materials to determine age, cultural association and season of use.

RESULTS: Excavation of a series of backhoe pits and test units within and adjacent to the bone exposure on the field surface indicated the presence of a small but dense bison kill midden. Stratigraphic evidence strongly suggests that the midden was originally much larger and has been largely destroyed by cut and fill processes. The type of kill could not be determined, but site setting suggests a pound or trap is the most likely explanation. Several Besant projectile points were found in good association with the bone midden, along with a single Pelican Lake point. Seasonally sensitive mandibles were recovered but have not yet been analyzed.

REPORT: In preparation

88-55

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Alberta Transportation
and Utilities
Highway 1:20
Widening

PROJECT TYPE: Mitigation

LOCATION/SETTING: The sites are located within a 5 km stretch of land to be affected by the proposed twinning of the Trans-Canada Highway east of Suffield. The terrain is predominantly flat to gently rolling native prairie.

METHODOLOGY: All of the sites were mapped, and the stone features within the right-of-way were feature mapped. Shovel testing was undertaken, and the subsequent excavation ranged in size from 4 to 14 sq. m per feature. Surface collections were also undertaken at two of the sites.

RESULTS: A total of 58 sq. m was excavated at 10 features within eight sites. Six flakes and 12 unidentifiable/identifiable pieces of bone were collected as a result of the excavations. The surface collection produced five flakes associated with cairns and one historical artifact associated with a ring.

SITE TYPES:
EbOs-59: cairn
EbOs-62: cairn
EbOs-63: cairns (4)
EbOs-64: cairns (2)
EbOs-65: stone circles (3)
EbOs-66: effigy
EbOs-67: stone circles (2) and cairn
EbOs-68: stone circles (3) and cairns (2)

REPORT: Complete, entitled "Historical Resources Impact Mitigation Highway 1:20 Widening, Suffield Final Report, Permit 88-55," by Rebecca J. Balcom

88-56

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

French Bay Resort Co.
Cold Lake Resort

PROJECT TYPE: Mitigation

LOCATION/SETTING: The Kinosoo site (GcOm-27) is situated on a high bench on a promontory on the southern shore of Cold Lake within French Bay Provincial Park.

METHODOLOGY: The site was discovered in 1986 in exposures created by vehicular traffic and recreational use. At that time, quantities of debitage and finished tools were exposed along approximately 1 km of shoreline. The testing program undertaken in

1988 included excavation of 46 shovel tests, three excavation blocks within the identified lodge area, and isolated 1 m units over the remainder of the building site to provide information on discrete areas of artifact concentrations and to assess the potential of other areas for cultural materials.

RESULTS: Only the field work has been completed to date. On the basis of the results of in situ recording and field observations, both lateral and vertical segregation of components can be demonstrated clearly. Preliminary analysis of the recovered artifacts indicate that components associated with Oxbow, Pelican Lake and Prairie Side-notched projectile point series are present at the site. Lithic materials consist of local cherts and quartzites, a distinctive salt and pepper quartzite, chalcedony and Swan River chert. Ceramics were recovered from two of the three excavation blocks. Two gun flints were also recovered.

SITE TYPES: Campsite

DATES: Middle Prehistoric (McKean collected in 1986) to historical periods

REPORT: In preparation, to be entitled "1989 The Kinosoo Site," by Gloria J. Fedirchuk

88-57

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

NOVA Corporation
Ghostpine West Lateral

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed right-of-way is 30.8 km in length and is located in southern Alberta.

METHODOLOGY: The proposed development area was examined by ground reconnaissance, consisting of a pedestrian traverse and intensive visual examination of selected portions of the proposed right-of-way. Visual inspection of exposures was conducted as well. In areas where surficial exposures were rare, emphasis was placed on subsurface testing (i.e., excavation of shovel holes) of the proposed right-of-way.

RESULTS: Seven previously unrecorded prehistoric sites and one palaeontological collection locality were identified during the ground reconnaissance. The palaeontological collection included a Hadrosaur mandible, cones of *Sequoiites dakotensis* (Brown), unidentified seeds and silicified wood fragments.

SITE TYPES: Isolated finds (DjPf-43 and EjPg-9), artifact scatters (EjPf-42 and EjPg-10), campsites (EjPg-11 to 13)

REPORT: Complete, entitled "Historical Resources Impact Assessment Nova Corporation of Alberta. Ghostpine West Lateral Project," by Edward J. McCullough

88-58	**Richard Callaghan** **ARESCO Ltd.** **P.O. Box 1174, Station G** **Calgary, Alberta**	**Urban Systems Ltd/** **Ozada Financial Corp.** **High Country Golf Estates**

PROJECT TYPE: Historical Resources Inventory and Assessment

LOCATION/SETTING: The project is located in the High River area, north of the Highwood River. The study area consists of approximately 230 acres on the flood plain of the Highwood River. The area has been ploughed and is currently in crop or pasture.

METHODOLOGY: Foot traverses and subsurface testing by shovel and backhoe were conducted as necessary.

RESULTS: Ten sites were located (EdPl-17 to 26). Five of these were prehistoric; one produced a Prairie Side-notched type of projectile point. The remaining five sites were historical in age. Three of these were identified as relating to the early settlement history of the area, while the remaining two are of unknown age.

REPORT: Complete, entitled "Historical Resources Inventory and Assessment, NW/SEC01 and SE/SEC12 of TP019/R29/W4M, Northwest Area Residential Subdivision at High River, Alberta, Final Report, Permit 88-058," by Colin Poole and Richard Callaghan

88-59

John Brumley
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Newlake Resources
Well Site and Access Road

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The proposed well site and access road are situated in open, hummocky prairie north of the Red Deer River and west of Jenner.

METHODOLOGY: Foot traverses of the entire access road and well site were conducted. The central portion of the access road right-of-way was found to have been bladed prior to examination, and the well site had been fenced.

RESULTS: Two previously unrecorded sites, EfOu-2 and 3, consist of two and three well-defined stone circles, respectively. Both sites are partially within the access road. Due to prior well site fencing and access road improvement, relocation was not possible. Stone circles at both sites were mapped, and a limited program of salvage excavation was conducted. Only limited quantities of undiagnostic cultural material, consisting of fire-cracked rock, quartzite and debitage, were recovered.

REPORT: In preparation

88-60

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Singleton Associated Engineering/Bow River Pipe Lines Mainline Looping Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed 120 km pipeline is situated between Hardisty and Wardlow. An alternate route of approximately 13 km, in the vicinity of the Battle River, was also assessed.

METHODOLOGY: Examination of the entire route involved a pedestrian traverse of the high and medium potential portions of the four sections of the Mainline Looping Project. Shovel tests were excavated in selected areas. Subsurface tests were also conducted at identified sites in order to evaluate site content and significance.

RESULTS: One historical and 21 prehistoric sites were identified during the ground reconnaissance and were assessed relative to the development project.

SITE TYPES: Isolated finds (EfOv-58 to 62, EhOv-4, 5, EiOv-4, 5, 7, ElOu-2, FdOt-11 and EcOt-9), artifact scatters (FaOu-3 and FdOt-12), campsites (EgOv-4, EiOv-6, EfOt-13, FcOt-7 and 8), stone feature (EhOv-6), historical homestead (ElOv-1)

REPORT: Complete, entitled "Historical Resources Impact Assessment Singleton Associated Engineering Ltd., Bow River Pipe Lines Ltd. Mainline Looping Program," by Edward J. McCullough

88-61

Rebecca J. Balcom
Environmental
Management Associates
1510 - 10 Avenue S.W.
Calgary, Alberta

Gulf Canada/Caroline
Gas Development
Transmission Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed transmission pipeline is approximately 40 km in length. The southern terminus is located approximately 21 km southwest of Caroline. The terrain is gently rolling to prominent ridges.

METHODOLOGY: Selected segments of the right-of-way were walked and examined visually. Shovel tests were excavated as appropriate to locate buried sites and to aid in assessing sites.

RESULTS: Three sites were recorded in association with the selected right-of-way and preliminary alignment that was altered subsequently. The sites include a small lithic scatter, a hearth and a buried protohistoric site, consisting of a metal knife and a quartzite core. In addition to these sites, six native burial grounds were documented with the aid of members of the Wesley Band of the Stoney Indians. None is closer than 2 km from the proposed facilities.

SITE TYPES:
FaPt-4: protohistoric small find
FaPt-5: hearth
ElPs-1: lithic scatter
FaPt-6: three burials
FaPt-7: at least one burial
FaPt-8: four burials
FaPt-9: one burial
FaPt-10: seven burials
ElPu-15: one burial

REPORT: Complete, entitled "Historical Resources Impact Assessment Caroline Gas Development Transmission Pipeline Final Report, Permit 88-61," by Rebecca J. Balcom

88-62

Rebecca J. Balcom
Environmental
Management Associates
1510 - 10 Avenue S.W.
Calgary, Alberta

Caroline Area Gas
Group/Gulf Canada
Caroline-Swan Hills
Gas Development

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed gas gathering system consists of approximately 62 km of pipeline right-of-way. The northern terminus is located approximately 4 km southeast of Caroline. The terrain ranges from gently rolling cultivated lands to forested terrain.

METHODOLOGY: Selected segments of the right-of-way were walked and examined visually. Shovel tests were excavated as appropriate to locate buried sites and to aid in assessing sites.

RESULTS: Two sites were recorded in association with the proposed development. One site (ElPr-1) is an isolated find, and the other (ElPp-4) is a small lithic scatter. In addition, a native Indian burial ground (FaPq-9), composed of at least six burials, was recorded 800 m from any proposed facilities.

REPORT: Complete, entitled "Historical Resources Impact Assessment Caroline Gas Development

Transmission Pipeline Final Report, Permit 88-62," by Rebecca J. Balcom

88-63	**Thomas H. Head** **Bison Historical Services** **3, 227 - 14 Street N.W.** **Calgary, Alberta**	**NOVA Corporation** **Pipeline, ElPa-1** **Mitigation**

PROJECT TYPE: Mitigation

LOCATION/SETTING: This project is located south and east of Endiang, Alberta and west of the Sullivan Lake basin, in an area of hummocky ground moraine. The ribstone stood on a high ridge overlooking the Sullivan Lake basin.

METHODOLOGY: Eight square metres were used to assess the nature of materials adjacent to the location formerly occupied by the ribstone and at the base of the ridge to the south. On the basis of that work, 22 sq. m were excavated at the base of the ridge. One metre provenience was maintained with 10 cm levels. All sediments were passed through 3/16 inch mesh screen.

RESULTS: Cultural materials around the ribstone included a limited lithic assemblage and a number of glass embroidery trade beads. Materials from the base of the ridge included two diagnostic points "Oxbow and Bitterroot" and an assemblage of other assorted tools and debitage. Two of the eight tools submitted for blood residue analysis yielded positive results: anti-bovine and anti-human reactions on an endscraper and anti-deer and anti-rabbit on the "Bitterroot" point. On the basis of the various artifacts, use of the ribstone may well have continued for over 5,000 years. Various activities including those associated with both campsites and workshops are suggested.

REPORT: Complete, entitled "Final Report Historical Resources Mitigation Sullivan Lake Lateral Loop Scapa Ribstone, ElPa-1," by Thomas H. Head

88-64	**Rebecca J. Balcom** **Environmental** **Management Associates** **1510 - 10 Avenue S.W.** **Calgary, Alberta**	**Tintagel Energy** **Corporation** **Taber Well Sites and** **Access Roads**

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The well sites are located on the south side of the Oldman River, approximately 23 km northeast of Taber.

METHODOLOGY: Procedures included examination of the surface and fortuitous exposures and shovel testing as appropriate to determine the presence of historical resources. Mitigation consisted of detailed site mapping (DlOx-2).

RESULTS: Two historical resource sites were recorded.

SITE TYPES: Site DlOx-2 is a multiple stone feature site. It consists of 45 stone circles, two rock alignments and a hearth. Site DlOx-3 consists of five stone circles.

REPORT: Complete, entitled "Historical Resources Impact Assessment/Mitigation Taber Area Wellsites and Access Roads Final Report, Permit 88-64," by Rebecca J. Balcom

88-65	**James A. Light** **Historical Resource** **Management** **910, 1335 - 12 Avenue S.W.** **Calgary, Alberta**	**Alberta Recreation** **and Parks** **William A. Switzer** **Provincial Park, Pine** **Bay Group Use Area**

PROJECT TYPE: Mitigation work was done on site FiQk-28 which will be affected by the construction planned for a new group use facility.

LOCATION/SETTING: The site is in the foothills within William A. Switzer Provincial Park. It is located on a small level area about 10 m above Jarvis Lake. The area is forested with a mixture of spruce and aspen poplar. Although some of the site area has been damaged by an existing cook shelter, a large portion remained undisturbed beneath the structure.

METHODOLOGY: The site was excavated in 1 x 1 m units with 10 cm levels. Ninety-three units were excavated in two blocks. The major excavation consisted of 77 units in the area beneath and around the cook shelter which had been removed from its piles. The remaining 15 units were placed on a narrow ridge immediately above the main area. All excavated matrix was screened through 6 mm mesh.

RESULTS: Two complete and three incomplete points seem to indicate at least three occupations of FiQk-28. The two identified points are a Plains Side-notched point and a Besant point. One large lanceolate point fragment has a broad, basally thinned base, but it has not been classified as yet. Preliminary analysis indicates that a horizontal patterning of artifact recovery consistent with three occupations is likely.

SITE TYPE: FiQk-28 is a multicomponent campsite with what appears to be a horizontal distribution rather than vertical stratigraphy.

REPORT: In preparation

88-66

Brian Reeves
Lifeways of Canada
1717 - 10 Avenue S.W.
Calgary, Alberta

Syncrude Canada Ltd.
Lease No. 22
Mitigative Excavations

PROJECT TYPE: Mitigation

LOCATION/SETTING: HgOv-77, located on Syncrude's Lease No. 22 approximately 45 km north of Fort McMurray, is on the north side of the Beaver River, west of the Fort McKay Highway.

METHODOLOGY: Studies consisted of the excavation by hand of 10 sq. m of the site.

RESULTS: A total of 1,770 artifacts was recovered. With the exception of a granite hammerstone, all were fragments of cores and flakes. One thousand seven hundred sixty-eight were manufactured from a local stone known as Beaver River Sandstone. No time or culturally diagnostic artifacts were found.

REPORT: Complete, entitled "Mitigative Excavations HgOv-77 Syncrude Canada Ltd. Lease No. 22 ASA Permit 88-66," by Brian Reeves

88-67

Milt Wright
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Alberta Forest Service
Peerless Lake
Recreation Area

PROJECT TYPE: HRIA

LOCATION/SETTING: The project is located on the north shore of Peerless Lake, in a small embayment approximately 5 km west of the settlement of Peerless Lake.

METHODOLOGY: Surface survey of the 400 x 400 m campground/ development area was augmented with subsurface testing in areas of ground cover. The development area was evaluated through a series of foot traverses using existing trail exposures and subsurface testing along former beach ridges of the lake.

RESULTS: One prehistoric site was recorded.

SITE TYPE: Campsite and lithic scatter

REPORT: In preparation

88-68

Rebecca J. Balcom
Environmental Management Associates
1510 - 10 Avenue S.W.
Calgary, Alberta

NOVA Corporation
North Lateral Extension Loop/Flat Lake Lateral Loop

PROJECT TYPE: HRIA

LOCATION/SETTING: The 50 km long North Lateral Extension Loop is located southeast of Hanna in native prairie an cultivated fields. The 27 km long Flat Lake Lateral Loop is located northwest of Vegreville, almost entirely in in cultivated fields.

METHODOLOGY: About 25 km of a 31 km segment of the North Lateral Extension Loop was examined, as was all of the Flat Lake Lateral Loop. Procedures consisted of foot traverses with shovel testing as appropriate.

RESULTS: Four sites were found on the North Lateral Extension Loop. These consist of two isolated finds, a small lithic scatter and a historical period foundation. A surface campsite was recorded on the Flat Lake Lateral Loop. A variety of tools and debitage were collected from this site.

SITE TYPES: Lithic scatter (EiOw-331), isolated find (EhOv-7), historical depression and foundation (EhOv-8), surface campsite (FjPa-2)

REPORT: Complete, entitled "Historical Resources Impact Assessment North Lateral Extension Loop, Flat Lake Lateral Loop #2 Final Report, Permit 88-68," by Rebecca J. Balcom

88-69 (see 88-35)

88-70

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Tera Environmental Consultants/Roan Resources Ltd.
Eagle Butte Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project investigated under this permit is located east of Orion, in the grasslands of southern Alberta. The pipeline right-of-way crosses Rogers Coulee, Timber Creek and a high, unnamed ridge.

METHODOLOGY: Fortuitous exposures and excavation of subsurface tests were used to identify sites along the entire proposed right-of-way. Subsurface tests were excavated at identified sites.

RESULTS: Eleven prehistoric sites were identified. The proponent elected to avoid the significant sites and/or features by relocating the right-of-way.

SITE TYPES: Artifact scatters (DiOq-19, DiPq-20 and DjOq-3), campsites (DjOp-9), stone features (DiOq-18, DjOp-5 to 8, DjOq-4 and 5)

REPORT: Complete, entitled "Historical Resources Impact Assessment Roan Resources Ltd. Eagle Butte Pipeline Project," by Gloria J. Fedirchuk

88-71	**Barry J. Dau** **Ethos Consultants Ltd.** **Box 20, Route 5** **Medicine Hat, Alberta**	**Newlake Resources Ltd./Canadian Landmasters Wardlow Gas Gathering System**

PROJECT TYPE: HRIA

LOCATION/SETTING: The project is situated on open prairie terrain, immediately northwest of the Red Deer River in the vicinity of the village of Wardlow.

METHODOLOGY: Approximately 55.5 km of 15 m wide pipeline rights-of-way were examined by foot and vehicle traverses. Shovel testing was undertaken in various locales.

RESULTS: No sites were identified within or immediately adjacent to the proposed rights-of-way.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Gas Gathering System near Wardlow, Southeastern Alberta, ASA Permit 88-71," by Barry J. Dau

88-72	**Eric Damkjar** **E.R.D. Heritage Consulting** **7701 - 86 Avenue** **Edmonton, Alberta**	**Texaco Canada Resources Valhalla Well Site and Access Road**

PROJECT TYPE: HRIA

LOCATION/SETTING: Located approximately 45 km northwest of Grande Prairie, near the community of Valhalla Centre, the proposed development area covers 3.5 ha of mostly flat, cultivated farmland.

METHODOLOGY: The entire area was traversed on foot, and 15 shovel tests were placed in areas covered with vegetation. Surface visibility was excellent over most of the development area.

RESULTS: No sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment, Texaco Canada Resources, Texaco Et Al Valhalla 6-7-75-9, Well Site and Access Road, Permit No. 88-72," by Eric Damkjar

88-73

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Phillips Petroleum
Ghost River Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed gathering system is approximately 40 km long and is located in eastern slopes of southwestern Alberta.

METHODOLOGY: The location of previously recorded sites within or immediately adjacent to the proposed additional right-of-way were revisited and verified in order to determine if the proposed development would impact the sites. A pedestrian traverse of the new right-of-way was also conducted. All fortuitous exposures were examined visually for evidence of prehistoric cultural materials. Subsurface tests, each approximately 30 cm in diameter, were excavated along the right-of-way and at features/sites which would be impacted by the proposed development.

RESULTS: Two previously recorded prehistoric sites (EhPr-13 and 17) and five new prehistoric sites were identified during the ground reconnaissance. Site EhPr-13 was not relocated at the recorded UTM location.

SITE TYPES: Isolated find (EhPs-2), artifact scatter (EhPr-21). campsites (EhPq-7 and EhPp-57), ceremonial site (EhPq-8)

REPORT: Complete, entitled "Historical Resources Impact Assessment Western Research, Division of Bow Valley Resource Services Ltd., Phillips Petroleum Resources Ltd. Ghost River Pipeline Project," by Edward J. McCullough

88-74	**Glenn S. L. Stuart** **Fedirchuk McCullough & Associates Ltd.** **304, 1725 - 10 Avenue S.W.** **Calgary, Alberta**	**American Trading** **Heathdale Area** **Pipeline**

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed right-of-way is approximately 65 km long and is located in the plains area of southeastern Alberta.

METHODOLOGY: A record review was conducted of the site survey records to determine the presence of any previously recorded sites in the proposed development zone. The entire proposed right-of-way was inspected. All fortuitous exposures were examined visually for evidence of prehistoric cultural materials. Shovel tests were excavated where surficial exposures were judged inadequate. Subsurface tests were conducted at identified sites in order to evaluate site content and significance.

RESULTS: Three prehistoric sites (EhOs-6 to 8) were identified.

SITE TYPES: Isolated finds (EhOs-6 and 8), artifact scatter (EhOs-7)

REPORT: Complete, entitled "Historical Resources Impact Assessment American Trading and Production Corporation Heathdale Area Pipeline," by Glenn S. L. Stuart

88-75	**Barry J. Dau** **Ethos Consultants Ltd.** **Box 20, Route 5** **Medicine Hat, Alberta**	**L.L. & E. Alta. Inc./** **Canadian** **Landmasters** **Grand Forks Well Site**

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed oil well site is situated in LSD 3-23-11-13 W4M, immediately southeast of the confluence of the Oldman and Bow rivers.

METHODOLOGY: An HRIA of the well site was requested by the ASA due to its proximity to the Murphy Medicine Wheel (DlOw-6). All portions of the proposed well site were examined by foot traverse surveys. Shovel tests were dug in various areas throughout the well site.

RESULTS: No historical resource sites were found within the well site. In addition, it was found that development of the well would not impact any portion of DlOw-6.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Oil Wellsite near the Grand Forks, Southeastern Alberta. ASA Permit 88-75," by Barry J. Dau

88-76

James A. Light
Historical Resource Management
910, 1335 - 12 Avenue S.W.
Calgary, Alberta

Alberta Transportation and Utilities
Site Mitigation

PROJECT TYPE: Mitigation on two sites, FbPf-4 and ElPb-3, which will be affected by the construction planned for secondary roads 835 and 589

LOCATION/SETTING: Both developments are located near the town of Stettler. FbPf-4 is located in a cultivated field in an area of glacial lake deposits, south of the town of Erskine. ElPb-3 is located in virgin prairie, in an area of very hummocky, glacial ablation moraine.

METHODOLOGY: Forty 1 x 1 m units were excavated at FbPf-4. Each unit was dug as a single level to approximately 20 cm below surface. No other provenience was taken because the site has been ploughed. All excavated soil matrix was screened through a 6 mm mesh. Seventy-nine 1 x 1 m units were excavated at ElPb-3. Excavations were done in 10 cm level. Tools and utilized flakes were measured in situ if possible. All excavated matrix was screened. A single surface ring was mapped and rock depths were taken. All buried cultural features were mapped.

RESULTS: No diagnostic materials were recovered at FbPf-4 during the present work. The assemblage consists of a number of split pebble scrapers and a range of detritus. A Pelican Lake point has been recovered from this site as part of permit 88-27. ElPb-3 proved to be a multicomponent site with at least three occupations. The earliest is an Oxbow occupation level at about 50 cm below surface. The latest is a Late Plains occupation associated with the surface ring. Between these occupations are less well defined deposits which include Duncan, Hanna, and McKean material, as well as Besant and Pelican Lake points. In all, five buried hearth features were recorded.

SITE TYPE: It is difficult to classify FbPf-4; however, the large number of small unifaces recovered suggest it is probably a campsite or perhaps a resource processing site of a specific nature. ElPb-3 is a multicomponent campsite which has been occupied on a number of occasions over the past 5,000 years.

REPORT: In preparation

88-77	**Barry J. Dau** **Ethos Consultants Ltd.** **Box 20, Route 5** **Medicine Hat, Alberta**	**Renaissance Energy/** **Antelope Land Services** **Jenner Pipeline**

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area is situated on open rolling prairie terrain, immediately north of the Suffield Military Reserve and ESE of the village of Jenner.

METHODOLOGY: Approximately 5.7 km of 15 and 20 m wide pipeline rights-of-way were examined by foot traverse survey. Shovel testing took place in various areas.

RESULTS: Two previously unrecorded surface stone feature sites (EeOs-34 and 35) were identified. Development will not impact these sites seriously.

SITE TYPES: Surface stone feature (stone circle, cairn, stone alignment)

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Pipeline Gathering System near Jenner, Southeastern Alberta. ASA Permit 88-77," by Barry J. Dau

88-78

Thomas H. Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
Maleb Lateral and
Meter Station

PROJECT TYPE: HRIA

LOCATION/SETTING: This project is south and west of Medicine Hat and west of the Cypress Hills, in an area of ground moraine. The project crosses Seven Persons Coulee and several of tributary drainages.

METHODOLOGY: The entire alignment, consisting of approximately 36 ha (20.2 km long by 18 m wide), was examined on foot and by shovel testing in areas of high and moderate potential. With the assistance of a line locator from NOVA Corporation, alignment changes were made in order to ensure that the stone circles were avoided.

RESULTS: Nine historical resource sites, consisting of two recent historical locales and seven prehistoric sites (DkOr-6 to 9 and DkOs-3 to 5) were identified. Work was not recommended at either of the historical locales or at the two prehistoric sites (DkOs-4 and 5) located in cultivated fields. Stone circles were associated with the remaining prehistoric sites, but realignment was required only at DkOr-7 and 8 and DkOs-3.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Maleb Lateral," by Thomas Head

88-79

Edward J. McCullough
Fedirchuk McCullough &
Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

PanCanadian
Petroleum
Westerose-Homeglen
Gas Gathering System

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed gathering system is located in west central Alberta on the eastern edge of parkland region.

METHODOLOGY: Examination of the entire route involved a pedestrian survey and an intensive visual examination of all exposures within the proposed right-of-way.

RESULTS: No historical resource sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment PanCanadian Petroleum Limited Westerose-Homeglen Gas Gathering System," by Edward J. McCullough

88-80

James A. Light
DS Consulting
733 Woodbriar Place S.W.
Calgary, Alberta

Clark Swanby & Co.
Callinghorse Estates
Phase 2

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed development will affect about 32 ha of land adjacent to the previously developed Phase 1. The development is located in SE-2-25-3-W5M. This site is just west of the city of Calgary, on the south rim of the Bow River valley.

METHODOLOGY: In addition to visual examination, shovel tests were excavated in areas with medium to high potential for buried archaeological material.

RESULTS: Two isolated finds (EgPn-324 and 325) were recovered, both from the surface. Further shovel testing did not encounter any buried material. No further work was recommended at either of these sites.

REPORT: Complete, entitled "Historical Resources Impact Assessment of Callinghorse Estates Phase 2 Subdivision Development Final Report Permit 88-80," by James A. Light

88-81

James A. Light
Historical Resource Management
910, 1335 - 12 Avenue S.W.
Calgary, Alberta

BHP Petroleum (Canada) Inc.
Pipelines

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed development is located in an area of native prairie on the north side of the Oldman River near the town of Taber. The proposed route is located mainly on the lowest floodplain terrace of the river but connects wells which lie on the middle terrace about 15 m above the river.

METHODOLOGY: The entire right-of-way was walked. Shovel tests were dug in areas of high and medium potential for buried historical resource sites. One site was located; it was shovel tested, recorded, mapped and photographed. Rather than disturb the site, BHP Petroleum elected to avoid the area by choosing a new route for the pipeline.

RESULTS: One site, DlPc-14, was recorded during the present work. This site is comprised of nine stone circles. Shovel testing revealed no buried components. No artifacts were observed either on the surface or in the shovel tests.

SITE TYPE: Prehistoric campsite

REPORT: Complete, entitled "Historical Resources Impact Assessment of Two Pipelines in S20, S28, and S29 T10-R18-W4M Final Report Permit 88-81," by James A. Light

88-82

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Renaissance Energy/
Antelope Land Services
Majorville Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline right-of-way is situated on open rolling prairie, immediately west of the Bow River and southeast of the village of Majorville.

METHODOLOGY: The entire 3,200 m long, 15 m wide, pipeline right-of-way was examined by foot traverse survey. The search for buried cultural deposits was undertaken by shovel testing and an examination of natural subsurface exposures.

RESULTS: No historical resource sites were found within or immediately adjacent to the right-of-way.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Pipeline Right-of-way near Majorville, Southeastern Alberta. ASA Permit 88-82," by Barry J. Dau

88-84

Alison Landals
Environmental Management Associates
1510 - 10 Avenue S.W.
Calgary, Alberta

Jacqueline Thomson
Bow Valley South Recreation Area

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area is located southeast of Bow Valley Provincial Park, between the Bow and Kananaskis rivers.

METHODOLOGY: The project area was examined by foot traverse. Exposures, including horse paths, tree throws and erosional features, were inspected. Shovel tests were excavated in areas of moderate to high potential and in areas of limited exposure.

RESULTS: Two new historical resource sites (EgPs-49 and 50) were identified.

SITE TYPES: Stone circle (EgPs-49), isolated find (EgPs-50)

REPORT: Complete, entitled "Historical Resources Impact Assessment Proposed Recreational Development NW22-Tp24-R8-W5, Near Seebee," by Alison J. Landals

88-85

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Shaman Energy
Fenn/Big Valley Gas Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline consists of a preferred right-of-way, 20 km in length, and an alternate route, approximately 5 km in length, located in the parkland region of Alberta.

METHODOLOGY: Due to the fact that final route selection would not be finalized until winter conditions had set in, an examination of the high potential areas was conducted in September. This examination consisted of a pedestrian traverse and intensive visual examination of select portions of the proposed right-of-way. Exposures were provided by ploughed surfaces, rodent burrows, wind and water-eroded surfaces and previous pipeline disturbance. The remainder of the route was examined in November under heavy snow and freezing conditions. Most of this area was of limited archaeological potential, and re-examination under more favourable weather conditions was not considered necessary. A 5 km re-route adjacent to Big Valley Creek was also examined in November. This area was considered to be of high potential and was re-examined after a chinook had melted the snow cover.

RESULTS: One previously recorded prehistoric site and 13 newly recorded sites were identified.

SITE TYPES: Isolated finds (ElPe-10 and 36, ElPf-63 and 64), artifact scatters (ElPe-27, 28, 30, 31, 34 and 35) and campsites (ElPe-10 and 36 and ElPf-63 and 64)

REPORT: Complete, entitled "Historical Resources Impact Assessment Shaman Energy Corporation Fenn/Big Valley Gas Project," by Edward J. McCullough

88-86	**Eric Damkjar** **E.R.D. Heritage Consulting** **7701 - 86 Avenue** **Edmonton, Alberta**	**Texaco Canada Resources** **Valhalla Well Site and Access Road**

PROJECT TYPE: HRIA

LOCATION/SETTING: Located approximately 47 km northwest of Grande Prairie, near the community of Homestead, the proposed development area covers 2.2 ha of mostly flat, forested land.

METHODOLOGY: The entire area was traversed on foot. Surface visibility was poor, except for a small area at the west end of the access road. Assessment was based on 37 systematically placed shovel tests.

RESULTS: One isolated find (GjOt-4), consisting of a small chert flake, was found in the northwest portion of the well site.

REPORT: Complete, entitled "Historical Resources Impact Assessment, Texaco Canada Resources, Texaco et al Valhalla 14-14-75-9, Well Site and Access Road, Permit No. 88-86," by Eric Damkjar

88-87

88-87	**B. O. K. Reeves** **Lifeways of Canada** **120 - 10 Street N.W.** **Calgary, Alberta**	**Brisbin Gates** **Engineering** **Aldersyde Feeder Main** **and Distribution Line**

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed Aldersyde Feeder Main and Distribution Line will run from the town of High River to Aldersyde. The proposed water line lies on the east side of Highway 1A right-of-way, 5 m west of the east boundary.

METHODOLOGY: This assessment included both visual inspection of the surface and erosional exposures and subsurface prospecting utilizing a backhoe.

RESULTS: No surface or buried historical resources were observed.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Proposed Aldersyde Feeder Main and Distribution Line Tongue Creek Crossing SW-19-9-28-4," by B. O. K. Reeves

88-88	**Gloria J. Fedirchuk** **Fedirchuk McCullough & Associates Ltd.** **304, 1725 - 10 Avenue S.W.** **Calgary, Alberta**	**Tera Environmental Consultants/Shell Canada** **Waterton North End Expansion Project**

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project investigated under this permit is located in the predominantly pristine boreal-cordilleran transition zone southwest of Pincher Creek, Alberta. The major water courses crossed by the proposed pipeline consist of Pincher Creek and Whitney Creek.

METHODOLOGY: All high and medium potential areas of the proposed right-of-way were examined. Site identification was based on examination of fortuitous exposures, as well as disturbances associated with previous road and pipeline construction and timber cutting areas, and on subsurface tests.

RESULTS: No historical resource sites were identified.

REPORT: Complete, entitled "Historical Resources Impact Assessment Tera Environmental Consultants (Alta.) Ltd. Shell Canada Limited Waterton North End Expansion Project," by Gloria J. Fedirchuk

88-90	**Edward J. McCullough** **Fedirchuk McCullough & Associates Ltd.** **304, 1725 - 10 Avenue S.W.** **Calgary, Alberta**	**Koch Pipelines Ltd/ Singleton Associates Engineering** **Kinsella Lateral**

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed 48 km long pipeline is located in east-central Alberta in the parkland region.

METHODOLOGY: The entire proposed right-of-way was examined by way of ground reconnaissance. Over 90% of the proposed development zone had been freshly cultivated at the time of the reconnaissance. Shovel tests were also excavated in selected areas. Subsurface tests were excavated at identified sites in order to evaluate site content and significance.

RESULTS: Six prehistoric sites were identified during the ground reconnaissance.

SITE TYPES: Isolated finds (FdOt-14, FeOu-5 and FfOu-1) and artifact scatters (FeOu-4 and 6 and FfOu-2)

REPORT: Complete, entitled "Historical Resources Impact Assessment Singleton Associated Engineering Ltd. Koch Pipelines Ltd. Kinsella Lateral Pipeline Project," by Edward J. McCullough

88-91

Peter T. Bobrowsky
407, 2341 Harbour Road
North Saanich (Sidney)
British Columbia

Stanley Associates Engineering/
Crestbrook Forest Industries
Athabasca Bleached Kraft Pulp Mill

PROJECT TYPE: HRIA

LOCATION/SETTING: The project area is located on the south bank of Athabasca River, north of town of Boyle, Alberta.

METHODOLOGY: An area of 408 ha and a 26 km right-of-way were examined as part of the impact assessment. Field examination involved a foot traverse of the entire development area. The linear study consisted of a single linear track along the right-of-way, visual examination of exposed ground surface, and shovel testing in areas of poor visibility or high potential. The areal survey involved zigzag traverses at 100 m intervals across the proposed impact area. Visual examination and shovel testing were also performed in areas of poor visibility or high potential.

RESULTS: A total of 665 test holes was excavated within the proposed impact area. No artifacts or prehistoric or historical sites were found in the study area. As a consequence, no further work is required, and the development was recommended to proceed.

REPORT: Complete, entitled "Historical Resources Impact Assessment from the Proposed Bleached Kraft Pulpmill at Spruce Valley Alberta," by Peter T. Bobrowsky

88-93

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

L.L. & E. Alta. Inc./
Canadian
Landmasters
Grand Forks Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The well site is situated in LSD 6-23-11-13-W4M, immediately downstream from the confluence of the Oldman and Bow rivers.

METHODOLOGY: The entire area of the proposed well site was examined by foot traverse survey. All natural subsurface exposures were examined for buried cultural materials. Shovel tests were dug in various portions of the well site.

RESULTS: No historical resources sites were found within or adjacent to the well site.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Oil Wellsite North of Grassy Lake, Southeastern Alberta. ASA Permit 88-93," by Barry J. Dau

88-94

Gloria J. Fedirchuk
Fedirchuk McCullough &
Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Lac La Biche Mission
Historical Preservation
Society
Drainage Ditch
Assessment

PROJECT TYPE: HRIA

LOCATION/SETTING: Notre-Dame des Victoires is located on River Lot 42, on the shore of Lac La Biche in north central Alberta.

METHODOLOGY: The objective of the study was to determine the feasibility of utilizing the route of an old drainage ditch between the Convent and Lac La Biche for a new drainage facility. The previous ditch line was documented. Six 1 x 1 m test units were excavated within the previous ditch line.

RESULTS: All of the recovered cultural material was encountered in a mixed context. Most of the items were historical and consisted of nails, glass fragments, ceramics, bottle caps, wire, unidentified metal fragments, mirror fragments, a fragment of a rosary, a marble, and wood and bone fragments. Prehistoric materials included quartzite flakes, quartzite and chert core fragments, and the base of a projectile point. The projectile point belongs to a lanceolate series, probably Agate Basin.

DATES: Prehistoric to recent

REPORT: Complete, entitled "Archaeological Assessment Notre-Dame des Victoires," by Gloria J. Fedirchuk.

88-95

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Petro-Canada Inc.
PCI Medicine Hat
Project 1 Pipeline

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The proposed pipeline right-of-way is situated on rolling open prairie terrain near Red Deer Lake, north of Medicine Hat.

METHODOLOGY: The entire 1.0 km length of 15 m wide pipeline right-of-way was examined by foot traverse survey. All natural subsurface exposures were examined for the presence of buried cultural materials. The mitigation phase of the program involved mapping the portion of the stone alignment in the recorded site (EbOo-12) which was to be impacted by pipeline construction and excavating five shovel tests along that portion of the alignment.

RESULTS: A single, large surface stone feature site, EbOo-12, was recorded within and adjacent to the pipeline right-of-way.

SITE TYPES: Surface stone feature (stone alignment, stone circle)

REPORT: Complete, entitled "An Historic Resources Impact Assessment and Mitigation North of Red Deer Lake, Southeastern Alberta. ASA Permit 88-95," by Barry J. Dau

88-96

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Western Research/ Alberta Energy Co. Pulp Mill Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project is located in the pristine boreal forest southeast of Lesser Slave Lake, Alberta. The project area abuts on to the Lesser Slave River.

METHODOLOGY: All areas of high and medium potential were examined. Site identification was based on examination of fortuitous exposures, as well as disturbances associated with previous road construction, and on subsurface tests.

RESULTS: One prehistoric site, GhPo-1, was identified.

SITE TYPES: Isolated find

REPORT: Complete, entitled "Historical Resources Impact Assessment Western Research Alberta Energy Company Ltd. Pulp Mill Project," by Gloria J. Fedirchuk

88-97

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Alberta Transportation and Utilities SR785 Realignment and Access Road to HSI

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project is located immediately south of Head-Smashed-In Buffalo Jump. The pipeline right-of-way crosses a coulee.

METHODOLOGY: The entire proposed right-of-way was examined on foot. Site assessment was based on examination of fortuitous exposures and on excavation of subsurface tests.

RESULTS: One prehistoric site, DkPj-35, was identified. The site is undisturbed and contains quantities of bone, fire-broken rock and lithic debitage. A minimum of three components were identified on the basis of deep tests excavated in a swale area.

SITE TYPES: Campsite

REPORT: Complete, entitled "1988 Historical Resources Impact Assessment Archaeological Survey of Alberta Realignment Secondary Road 785 and New Access Road," by Gloria J. Fedirchuk

88-98	**Rebecca J. Balcom** **Environmental** **Management Associates** **1510 - 10 Avenue S.W.** **Calgary, Alberta**	**Chris Wilson** **High River Subdivision**

PROJECT TYPE: HRIA

LOCATION/SETTING: The subdivision consists of about 6 ha and is situated west of the town of High River on the lower south terrace of the Highwood River. Extensive terrain modification had already taken place.

METHODOLOGY: Foot traverses were made over the entire area. These were accompanied by examination of exposures and shovel testing.

RESULTS: No sites were recorded.

REPORT: Complete, entitled "Historical Resources Impact Assessment Chris Wilson Subdivision High River, Alberta Final Report, Permit 88-98," by Rebecca J. Balcom

88-99	**Thomas H. Head** **Bison Historical Services** **3, 227 - 14 Street N.W.** **Calgary, Alberta**	**Town of Redcliff** **Residential Park**

PROJECT TYPE: HRIA

LOCATION/SETTING: This project is located on the north side of the South Saskatchewan River, just west of the town of Redcliff. The project encompasses a number of low fluvial terraces immediately above the river.

METHODOLOGY: The entire 5 ha park was examined using foot traverses, surface examinations and shovel testing. Historical documentation was undertaken subsequently at the University of Calgary and the Glenbow Museum.

RESULTS: A single, historical site, the Redcliff Water Treatment Plant, is within the area scheduled for development. The facility evidently was constructed in 1910 and represents one of the earliest water treatment plants in the province of Alberta. It is likely the earliest one for a community the size of Redcliff. All operating systems have removed, leaving only structural shells. Additional work was not recommended.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Redcliff River Valley Park LSD-8-6-13-6-W4M and LSD-5-5-13-6-W4M," by Thomas H. Head

88-100

Walt Kowal
Walt Kowal Consulting
6816 - 105A Street
Edmonton, Alberta

Dow Chemical Canada
Fort Saskatchewan
Plant Site Expansion

PROJECT TYPE: HRIA

LOCATION/SETTING: The study area encompasses 350 ha (1.3 sections), most of which is farmland. Approximately 80% of the area has been cultivated recently, while the remainder is divided between aspen/willow treed areas and low-lying grassy/slough areas.

METHODOLOGY: In-field investigations consisted of intensive foot traverses of the proposed development area. Visual examination was augmented by shovel tests at regular intervals over the entire site. Areas around historical or archaeological sites were examined more extensively.

RESULTS: Two previously reported sites were revisited, and one of these (FkPg-14) was identified. Three new archaeological resources sites were located: FkPg-86 (isolated find) and FkPg-4 and 85 (lithic scatters). Two historical sites were recorded, and their detailed occupation histories were ascertained. It was recommended that development be allowed to proceed.

REPORT: Complete, entitled "Historical Resources Impact Assessment Dow Chemical Canada Inc. Expansion Project Final Report," by Walt Kowal

88-101

B. O. K. Reeves
Lifeways of Canada
1717 - 10 Avenue S.W.
Calgary, Alberta

Jaegar Homes/IMC Consulting Group Conservation Excavations McKenzie Mountain Park Subdivision

PROJECT TYPE: Mitigation

LOCATION/SETTING: EfPl-93, a native archaeological site, is situated on the east side of the Bow River, north of Highway 22X, in the McKenzie-Mountain Park subdivision.

METHODOLOGY: Thirty-seven backhoe pits were excavated at various locales in the southern portion of the site, and 17 pits were excavated in a ploughed swale 260 m north from the southernmost pits. Hand excavations were undertaken in the two areas where backhoe tests encountered artifacts.

RESULTS: Four hundred fifty-nine artifacts were recovered from the test excavations, and two were collected from the surface and backhoe trenching. These included two projectile points, one Besant side-notched point, one fragmentary point base, one bifacial knife, two scrapers, one pebble hammerstone, three wedges, five flake perforators/gravers, eight utilized/retouched flakes, one core fragment and 348 flakes, consisting primarily of cobble reduction, retouching and resharpening flakes primarily from locally available quartzites.

REPORT: Complete, entitled "Conservation Excavations EfPl-93 McKenzie-Mountain Park Subdivision," by B.O.K. Reeves

88-102

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Peace Pipe Line Ltd./ Tera Pipeline Environmental Consultants
Progress Pipeline Extension

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline is located north of Peace River in the boreal forest of northwestern Alberta.

METHODOLOGY: Because of snowy conditions, only select portions of the proposed right-of-way were examined. These areas were traversed on foot, and subsurface tests were excavated.

RESULTS: No historical resource sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Tera Environmental Consultants (Alta.) Ltd. Peace Pipe Line Ltd. Progress Extension Pipeline Project," by Edward J. McCullough

88-103

Martin P. R. Magne
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Alberta Culture and Multiculturalism
Writing-On-Stone Provincial Park Rock Art Conservation

PROJECT TYPE: Research

LOCATION/SETTING: Research was undertaken in Writing-On-Stone Provincial Park and in the immediate vicinity. Areas investigated include cliffs and coulees along Milk River and associated intermittent creek tributaries. Considerable attention was focused on sites in Rocky Coulee on the south side of the Milk River.

METHODOLOGY: In the company of Ian Wainwright from the Canadian Conservation Institute, and assisted by Michael Klassen, I visited almost all of the pictograph sites in the immediate vicinity of Writing-On-Stone, taking 19 samples of pigment, salts, bird droppings, spalled pictograph pieces, and insect cases at seven of these sites (DgOv-2-1, DgOv-57, DgOv-78, DgOv-82, DgOv-88, DgOw-19, DgOw-20).

RESULTS: Overall, the pictographs appear to be in more immediate danger of loss than do the petroglyphs. DgOw-19 and 20 are being subjected to considerable spalling from salt efflorescence pressures which are pushing rock flakes, some quite large, from the rock face. The "Thunderbird" at DgOv-88 is in danger of loss through water washing over it from an overhang.

Research is not yet complete, but Wainwright is in process of several analyses. First, he is examining all of the pigment samples to determine their composition, through X-ray diffraction, X-ray microanalysis (for inorganic identifications), infrared spectroscopy and polarized light microscopy (for organics). He has determined that there is no evidence for organic media with the ochre paints. The X-ray diffraction and microscopy have identified hematite and goathite (a hydrate of hematite) as the bases of the ochre paints. Analyses of efflorescence and pigment samples have identified gypsum, kaolinite, calcium carbonate hydrate, magnesium carbonate hydroxide anhydrate, magnesium sulphate hydrate and magnesium oxalate hydrate. Wainwright is also cutting the spalled rock fragments we collected, for thin-section analysis.

REPORT: In preparation; preliminary reports have been provided at 1989 meetings of the Archaeological Society of Alberta and Canadian Archaeological Association.

88-104

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

SaskOil
Bowmanton Area
Pipeline

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The project area is situated immediately northeast of the city of Medicine Hat in the vicinity of Chappice Lake.

METHODOLOGY: During the HRIA phase of the program, all 13 km of 15 m wide pipeline right-of-way were examined by combinations of foot and vehicle traverse surveys. All natural subsurface exposures were examined for the presence of buried cultural materials. Shovel testing was used to search for buried cultural materials and to examine the potential of surface stone features to be impacted by development. During the mitigation phase of the project, the two stone circles (#1 and 11) in site EaOo-8, which were threatened with disturbance due to pipeline construction, were mapped. No excavations were undertaken. In addition, one stone circle in EaOo-5 was fenced to protect it during construction.

RESULTS: Five previously unrecorded surface stone features sites (EaOo-5 to 8 and EbOo-13) were identified. Portions of EaOo-5 and 8 were threatened with disturbance due to pipeline construction.

SITE TYPES: Stone circles

REPORT: Complete, entitled "An Historic Resources Impact Assessment and Mitigation Program at a Proposed Pipeline Right-of-way North of Medicine Hat, Alberta. ASA Permit 88-104," by Barry J. Dau

88-105

Rebecca J. Balcom
Environmental Associates
1510 - 10 Avenue S.W.
Calgary, Alberta

Amoco Canada
Ricinus Bearberry Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The 39 km long pipeline is located 35 km northwest of Sundre in forested rolling terrain.

METHODOLOGY: The Clearwater and James rivers were examined in detail, and the Raven River was subject to a brief reconnaissance. Procedures consisted of foot traverses and examination of exposures. Frozen ground precluded shovel testing except at the site that was recorded.

RESULTS: One lithic scatter (ElPs-2) was recorded on the north side of the James River. The site is on a terrace that has been almost entirely destroyed.

REPORT: Complete, entitled "Historical Resources Impact Assessment Ricinus Bearberry Viking Gas Pipeline Project Final Report, Permit 88-105," by Rebecca J. Balcom

88-106

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

PanCanadian Petroleum
Badger Battery Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project is located in the pristine grasslands south of Bow City, Alberta. The pipeline right-of-way crosses the Lonesome Lake drainage channel.

METHODOLOGY: The entire proposed right-of-way was examined on foot. Site identification was based on examination of fortuitous exposures and on subsurface tests.

RESULTS: One prehistoric site, EcPc-37, was identified.

SITE TYPES: Campsite

REPORT: Complete, entitled "1988 Historical Resources Impact Assessment PanCanadian Petroleum Limited Badger Battery Solution Gas Conservation Project," by Gloria J. Fedirchuk

88- 107 **Cancelled**

88-108

B. O. K. Reeves
Lifeways of Canada
1717 - 10 Avenue S.W.
Calgary, Alberta

Tirion Properties Ltd.
The Hamptons Phase I Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The project, in Section 24-25-2-W5M, is situated in the northwestern sector of the city of Calgary. The lands are part of the Nose Hill Uplands and northeastern escarpment overlooking the Beddington Creek valley.

METHODOLOGY: Subsurface prospecting was carried out by backhoe for a five-day period to explore for deeply buried campsites or bison kills in suitable topographic locales. One hundred pits were excavated. No buried campsites were found. Two bison kills (EgPm-254 and 255) were discovered in the ravine. Randomly exposed cobbles were noted on some of the higher benches. Lower surfaces appear to be covered with a veneer of glacial lacustrine and fine slope wash deposits. Very little rock was noted in these surfaces. No cultural materials were noted in this inspection of ploughed lands.

RESULTS: The only palaeontological specimen noted was the weathered portion of a bison metapodial bone recovered from backhoe test B #4. It lay above Mazama ash and, therefore, was less than 6,000 years in age. It may represent the scattered bones from a natural death or a human kill. The find spot lies within areas which will be conserved as parklands. No remains of historical structures or other features relating to early white settlement were observed on Section 24. Two prehistoric stone feature sites and two bison kills were located. No buried campsites were found during the subsurface prospecting program. No further studies are recommended.

SITE TYPES: Stone features (EgPm-252 [cairn] and 253 [stone tipi ring], bison kills (EgPm-254 and 255)

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Section 24, Township 35, Range 2, West of 5th M, ASA Permit 88-108," by B. O. K. Reeves

88-109

Thomas H. Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
Hudson Lateral
Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: This project parallels an existing pipeline north and east of Oyen, Alberta, in an area of ground moraine, much of which is cultivated. The project crosses Sounding Creek, as well as a number of tributary drainages.

METHODOLOGY: The entire alignment, consisting of approximately 18 ha (18.0 km long by 10.0 m wide), was examined on foot, accompanied by backhoe testing in areas of high and moderate potential.

RESULTS: Seven prehistoric sites (EjOn-1 and EjOo-2 to 7) were identified. The nature of these sites is such that work was only recommended at the one stone circle site which would be directly impacted (EjOo-2). This work consisting of feature mapping was subsequently undertaken.

SITE TYPES: Stone circles (EjOo-2 and 5), isolated finds (EjOo-3 and 6), small finds (EjOn-1 and EjOo-7), small campsite on Sounding Creek (EjOo-4)

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Hudson Lateral Loop," by Thomas H. Head

89-1

Sheila J. Minni
15104 - 97 Avenue
Edmonton, Alberta

Edmonton Power
Historical Cemetery

PROJECT TYPE: The project consisted of archaeological monitoring of an Edmonton Power excavation project which may impact the historical cemetery, FjPi-63, located near the Rossdale Power Plant.

LOCATION/SETTING: The study area is located in the city of Edmonton within the Rossdale Power Plant yard.

METHODOLOGY: Visual inspection was conducted during excavations by heavy machinery.

RESULTS: The excavation did not expose remains associated with FjPi-63.

REPORT: Complete, entitled "Archaeological Monitoring, FjPi 63, Rossdale 4th Transformer Addition Project," by Sheila J. Minni

89-2

Stanley Van Dyke
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Wellore Energy
Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The conventional well site is located on a low riverine terrace, approximately 50 m south of the Red Deer River and 10 km north of Jenner, Alberta.

METHODOLOGY: Archaeological studies consisted of the examination of lightly snow-covered well site and monitoring of ripping, topsoil removal and levelling operations and the excavation of flare pits.

RESULTS: No prehistoric sites were identified.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Wellsite 15-2-22-9-W4M," by Stanley Van Dyke

89-3

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

North Canadian Oils
Bowmanton Area
Pipeline Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed Bowmanton Area Pipeline project and associated well sites lie within an area of mixed prairie. The area is located immediately east of the South Saskatchewan River. Topography ranges from level to strongly rolling pristine prairie.

METHODOLOGY: A site file search was conducted to determine the presence of previously recorded sites in the area. An initial attempt was made to examine the proposed development zone in January, 1989. At that time, only 5% of the ground was clear enough to permit observation of prehistoric remains. Therefore, the entire right-of-way was examined again in March, 1989, and three LSDs in which the proposed well sites were to be located were examined cursorily. Since the ground was frozen, shovel testing to assess the sites was not undertaken. In April, the specific well sites were staked, and the locations were assessed by inspection of exposures and excavation of shovel tests.

RESULTS: Two previously recorded sites (EcOp-138 and 139) and ten newly recorded sites (EcOp-141 to 150) were identified during the ground reconnaissance. No further study relative to the proposed project is recommended at any of these sites; however, it is recommended that construction activities be restricted to the proposed right-of-way and well site locations to avoid inadvertent impact to the sites.

SITE TYPES: Artifact scatter, campsite, stone feature sites

REPORT: Complete, entitled "Historical Resources Impact Assessment North Canadian Oils Limited Bowmanton Area Pipeline Project and Associated Well Sites," by Fedirchuk, McCullough and Associates

89-4 **Cancelled**

89-5

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
McGregor Lake
Lateral

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline right-of-way is located approximately 15 km southeast of Milo, Alberta. The area of impact comprises approximately 14.5 ha, not including the temporary right-of-way which encompasses approximately 7 ha. The pipeline route crosses major grasslands and does not intersect any permanent water bodies.

METHODOLOGY: File searches were conducted to identify previously recorded sites in the study area. In addition, multistage field studies were undertaken. Initially, a proposed alignment corridor was examined, and ten prehistoric sites were identified and marked for avoidance. The alignment was then altered to avoid these sites, and a second examination was conducted.

RESULTS: Fifteen prehistoric sites (EdPd-22 to 31 and EcPe-7 to 11) were identified, but only four are directly associated with the final pipeline route. Direct impacts are anticipated at two sites (EcPe-7 and 9). Impact at both sites is expected to be minimal, and no additional work is recommended. Two sites (EcPe-8 and EdPd-22) are located adjacent to the right-of-way. EcPe-8 will not be impacted, and EcPc-22 should not be impacted as long as construction activities are restricted to the proposed right-of-way.

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment McGregor Lake Lateral ASA Project Number 89-5," by Thomas Head

89-6

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Morrison Petroleums
Hays Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site and its associated access road are situated on the floor of the Bow River valley, northwest of the village of Hays. The well site itself is situated in LSDs 7 and 10 of Section 9-14-14-W4M with the target for drilling in LSD 8.

METHODOLOGY: The HRIA consisted of surface inspection of the original location for the proposed lease and its access road. This was followed by a surface inspection of the relocated well site and access road and shovel testing of areas within and adjacent to the relocated lease.

RESULTS: Two surface stone feature sites were identified. No diagnostic materials were found in either site. The well site was relocated to avoid both sites.

SITE TYPES: EaOx-2 - 13 stone circles and 2 cairns
EaOx-3 - 16 stone circles

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Wellsite North of Hays Southeastern Alberta - ASA Permit 89-6," by Barry J. Dau

89-8

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

L.L. and E. Alta Inc.
Alltalle et al.
Grand Forks Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site is situated on the southern rim of the South Saskatchewan River valley, immediately south of the confluence of the Bow and Oldman rivers.

METHODOLOGY: The HRIA consisted of surface inspection of the proposed well site and its access road using linear or zigzag foot traverse surveys. In addition, shovel testing was undertaken adjacent to the recorded site.

RESULTS: A single surface stone feature site (DlOw-27) was recorded within and adjacent to the proposed well site. No diagnostic material was found in the site. A portion of the site was fenced off to prevent disturbance during well site development.

SITE TYPES: Stone circles

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Wellsite Near the Grand Forks, Southeastern Alberta - ASA Permit 89-8," by Barry J. Dau

89-9

John Priegert
Dept. of Anthropology
University of Alberta

University of Alberta
GbPv-16 McLeod
(Carson) Lake
Research Excavation

PROJECT TYPE: Research

LOCATION/SETTING: GbPv-16 is located on the north shore terrace of McLeod (Carson) Lake, within Carson-Pegasus Provincial Park, in the Swan Hills Uplands northeast of Whitecourt.

METHODOLOGY: Conventional excavation of 6 sq. m was performed on a site previously discovered during an assessment of park resources. Trowels and screens (6 and 2 mm) were used. Mapping artifacts in situ and recording depths were standard procedure.

RESULTS: Approximately 2,000 pieces of lithic material were recovered from within humus to within glacial deposits about 40 cm below surface. Most of the lithic remains are small pieces, primarily flakes and fragments. Several cores can be individualized by their distinctive lithology, and refit studies may reveal the extent of artifact movement within the sediments. Two hearth features were excavated. Five cultural presences can be discerned, although their chronological relationship awaits further analysis. They are an early 20th century native occupation, an occupation by people bearing a Pelican Lake-like projectile point, another by users of a McKean-like point, a third by users of a stemmed and shouldered point, and another evidenced by the presence of an unshouldered lanceolate point. Bone preservation is apparently poor, and no charcoal suitable for radiometric dating was recovered.

SITE TYPE: Multicomponent campsite

REPORT: Master's thesis in preparation, to be entitled "Prehistoric Chronology of the Swan Hills," by John Priegert

89-10

Gerald A. Oetelaar
Dept. of Archaeology
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Calgary, Alberta

Alberta Culture and
Multiculturalism
Strathcona Site

PROJECT TYPE: Research/archaeological field school

LOCATION/SETTING: The site is located on the east side of the North Saskatchewan River, in the county of Strathcona, near the eastern limits of the city of Edmonton.

METHODOLOGY: Excavations at the Strathcona site during the 1989 field season were designed to investigate the nature of the hypothesized domestic occupation in more detail. The prime objective of the field work was to determine if additional post molds might occur in the immediate vicinity of the 1988 block excavation.

The area selected for excavation included 26 contiguous 1 x 1 m units located along the western periphery of the 1988 block excavation. Excavation was done by hand using trowels. All matrix removed from the units was sieved through 1/4 inch screens. In addition, small bulk samples were removed from the northeast corners of the units for later processing. During the summer months, over 150 bulk samples were processed in the field using an air pump and an associated container of water. Given the proper pretreatment, most of the 500-1,000 ml samples could be processed in less than 30 minutes. The materials collected from these flotation samples are being analyzed by Hugh Middleton as part of his honours thesis.

RESULTS: Excluding the materials obtained from the flotation samples, over 9,000 items were recovered. Over 80% of the material recovered consisted of lithic debitage with only minor quantities of bone, fire-broken rock, and Euro-Canadian goods. Diagnostic artifacts include one complete McKean point, one complete Plain/Prairie side-notched point, one basal fragment of a Besant point, one point preform, and two point fragments of unknown cultural affiliation. Other flaked stone tools present in the 1989 assemblage include large end- and sidescrapers, crude bifaces or preforms, and a variety of edge-modified flakes.

SITE TYPE: Habitation site and possible lithic workshop

CULTURAL AFFILIATION: Middle and Late Prehistoric

DATES: From contact through to ca. 4,000 or 5,000 years BP, based on radiocarbon dates and projectile point typology

REPORT: Complete, entitled, "Final Report of the 1989 University of Calgary Archaeological Field School at the Strathcona Site (FjPi-29)," by Gerald A. Oetelaar

89-12

Eric Damkjar
E.R.D. Heritage Consulting
7701 - 86 Avenue
Edmonton, Alberta

NOVA Corporation
Mount Valley Lateral and Meter Station

PROJECT TYPE: HRIA

LOCATION/SETTING: Located approximately 60 km west of Grande Prairie, the proposed pipeline traverses mixed wood forest for approximately 45% of the route (the western section), while the remainder is cultivated.

METHODOLOGY: The entire route was traversed by foot, except for 3.5 km of the forested zone. The surface, as well as natural and man-made subsurface exposures, were examined, and judgmentally placed shovel tests were made where appropriate.

RESULTS: One site (GgQw-1) was discovered 150 m west of the right-of-way, just north of the Redwillow River. An historical site, reported to be on the north side of the Redwillow River, was determined to be well away from the right-of-way.

SITE TYPES: Prehistoric lithic scatter, historical grave site

DATE: The historical grave site dated from 1916.

REPORT: Complete, entitled "Historical Resources Impact Assessment Nova Corporation of Alberta Mount Valley Lateral and Meter Station Townships 70-71, Ranges 11-14, W6M Permit No. 89-12," by Eric Damkjar

89-13

Eric Damkjar
E.R.D. Heritage Consulting
7701 - 86 Avenue
Edmonton, Alberta

South Peace Regional Planning Commission
Dunvegan Boat Launch

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed boat launch facility is located on the south bank of the Peace River at Dunvegan, Alberta. In addition to the presence of historical fur trade remains, the banks of the Peace River are considered to have high potential for prehistoric archaeological and palaeontological remains.

METHODOLOGY: Fieldwork was conducted in early May, 1989 and focused on the flat area associated with the parking lot, ramp and a small portion of the access road. Shovel testing revealed that much of the development area had been disturbed previously.

RESULTS: The only historical resources identified consist of four collapsed building and a few associated features and artifacts. These resources are not considered sufficiently significant to warrant further mitigation.

REPORT: Complete, entitled "Historical Resources Impact Assessment Proposed Dunvegan Boat Launch Project Section 7 of Township 80, Range 4, W6M," by E.R.D. Heritage Consulting

89-14

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Luscar Ltd.
Paintearth Mine Extension

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project is situated in a parkland area, consisting of a mosaic of prairie tracts interspersed with aspen groves. It lies approximately 3 km south of the Battle River and 2 km north of Paintearth Creek.

METHODOLOGY: All of the archaeologically sensitive areas were examined. Shovel tests were excavated in selected areas.

RESULTS: Eleven prehistoric sites (FcPa-23 to 33) were identified.

SITE TYPES: Isolated finds, artifact scatters, campsites

REPORT: Complete, entitled "Historical Resources Impact Assessment Luscar Ltd. Paintearth Mine Extension," by Fedirchuk, McCullough and Associates

89-15

Eric Damkjar
E.R.D. Heritage Consulting
7701 - 86 Avenue
Edmonton, Alberta

Beairsto, Stewart, Weir Engineering
Sturgeon Lake Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed subdivision is located 70 km east of Grande Prairie, Alberta. The development area borders the south side of Sturgeon Lake and, therefore, has a high potential for historical resources.

METHODOLOGY: Field work focused on areas judged to be of high potential for archaeological resources, specifically, the lake margin and a couple of elevated locations back from the lake. The surface, as well as natural and man-made subsurface exposures, were examined, and judgmentally placed shovel tests were made where appropriate.

RESULTS: Four prehistoric sites (GgQj-12 to 15) and three historical sites were identified.

SITE TYPES: Isolated lithic finds, small historical campsite, farmstead, isolated farm building

REPORT: Complete, entitled "Historical Resources Impact Assessment Proposed Sturgeon Lake Subdivision Sections 28, 29, 32, 33 of Township 70, Range 24, W5M Permit No. 85-15," by E.R.D. Heritage Consulting

89-16

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Calgary, Alberta

Peace Pipe Line
Pouce Coupe South to Gordondale Pump Station Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project is situated in mixed boreal forest. Drainage is provided by Henderson and Sergeant creeks and the Pouce Coupe River. The area is characterized by upland forests interspersed with muskeg and sloughs. Approximately 15% of the proposed development zone has been cultivated.

METHODOLOGY: A site file search was conducted to determine the presence of previously recorded sites in the area. In addition, a two-person team conducted a pedestrian survey of approximately 80% of the proposed right-of-way. All exposures were examined for cultural remains. Subsurface tests were excavated at the proposed crossing of Henderson Creek and randomly along the proposed right-of-way.

RESULTS: No historical resource sites were identified.

REPORT: Complete, entitled "Historical Resources Impact Assessment Peace Pipe Line Ltd. 219.1 mm O.D. Pouce Coupe South (Drummond 7-20) to Gordondale Pump Station Pipeline Project," by Fedirchuk, McCullough and Associates Ltd.

89-17

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Alberta Transportation and Utilities
SR 879 Realignment

PROJECT TYPE: Mitigation

LOCATION/SETTING: The SR 879 realignment is situated on the northern wall of the South Saskatchewan River valley in the northwest quarter of Section 17-11-11-W4M

METHODOLOGY: The project took place in two phases. Phase 1 consisted of a backhoe testing program at a previously unrecorded stone alignment site to search for buried kill deposits, limited feature mapping and auger testing of a sample of stone circles from a previously recorded surface stone feature site (DlOu-13), and limited feature mapping and auger testing of a sample of stone circles from a previously unrecorded surface stone feature site (DlOu-18). Phase 2 of the program consisted of the completion of limited feature mapping and auger testing at sites DlOu-13 and 18 and the excavation of approximately 176 sq. m within and adjacent to one feature (stone circle 3) in site DlOu-13. Excavation was taken to 15-20 cm below surface.

RESULTS: Site DlOu-13 contains six stone circles, two cairns and a stone cluster. Site DlOu-18 contains eight stone circles. Site DlOu-19 contains a single, well-defined stone alignment 135 m in length. During mitigation at the sites, 88 auger holes, encompassing 2.64 sq. m, were drilled within and adjacent to 12 stone circles in sites DlOu-13 and 18. No cultural material was found. Excavations within and adjacent to stone circle 3 in site DlOu-13 resulted in the recovery of 14 pieces of cultural material. No diagnostics were found.

SITE TYPES: Multiple stone circle/cairn (DlOu-13 and 18), stone alignment (DlOu-19)

REPORT: Complete, entitled "Phase I and II Historic Resources Mitigation at the Proposed Secondary Road 879:06 Realignment North of Bow Island, Southeastern Alberta - ASA Permit 89-17," by Barry J. Dau

89-18

Brian O.K. Reeves
ARESCO Ltd.
P.O. Box 1174, Station G
Calgary, Alberta

Qualico Developments
Calgary Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The project is located in the Calgary area, west of the Bow River. The study area covered approximately 40 acres of land on prairie level, west of the Bow River and southeast of a glacial spillway channel. The area has been used for agriculture and recently as a natural park area.

METHODOLOGY: Two of four prehistoric sites located under permit 77-105 were examined by foot traverse and subsurface testing by shovel and backhoe.

RESULTS: No further evidence of prehistoric use was discovered.

REPORT: Complete, entitled "Historical Resources Impact Assessment, E 1/2 S11 & W 1/2 S12/23/1/5, Diamond Cove Residential Subdivision in Calgary, Alberta; Final Report, Permit 89-018," by Brian Reeves and Colin Poole

89-19

Michael Forsman
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Alberta Culture and Multiculturalism
Fort George

PROJECT TYPE: Research

LOCATION/SETTING: The site is located in east central Alberta, on the north bank of the North Saskatchewan River, about 11 km southeast of Elk Point.

METHODOLOGY: Research excavations were conducted in the area of the Main House. All structural remains and features were mapped in place. All excavated material was screened using 6.3 mm mesh. Eighty percent of the matrix was screened further through 3.5 mm mesh.

RESULTS: A total of 250 sq. m of contiguous excavation was completed, with recovery of over 100,000 artifacts and faunal fragments. Four rooms and part of a fifth were exposed. These indicated that the structure was 7.3 m wide and over 24 m long.

SITE TYPE: North West Company fur trade and provisioning fort

REPORT: In preparation.

89-20

Brian Smith
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Dunvegan Historical Society
Historic Dunvegan

PROJECT TYPE: Mitigation

LOCATION/SETTING: Historic Dunvegan is located on the first terrace on the north bank of the Peace River along Highway 2, approximately 25 km south of Fairview, Alberta. Portions of the sites are disturbed by agriculture and settlement.

METHODOLOGY: Archaeological excavations were conducted around the perimeter of the Hudson's Bay Co. 1877 Factor's House (GlQp-7) before restoration of that building commenced. Excavations focused on those areas near the building that had not been excavated previously, in particular the north building additions.

Archaeological excavations were also conducted around the perimeter of the St. Charles Oblate Church (GlQp-6) before restoration of that building commenced.

RESULTS: Considerable evidence of the north addition of buildings to the Factor's House were exposed. Building stone foundations were intact, giving a precise position of these features in relation to the Factor's House. A cribbed cellar was also found and excavated in the kitchen area, north of the Factor's House.

Investigations around the perimeter of the church revealed a series of fence lines. Deeper excavations revealed at least three well-defined prehistoric components beneath historical remains. The lowest component (60 cm below surface) is approximately 1,850 years BP, while the latest occupation dates to 670 years BP. Artifacts and faunal remains were recovered from all three components.

SITE TYPE: Historical fur trade and mission, prehistoric campsite

REPORT: In preparation

89-21

J. Rod Vickers
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Alberta Culture and Multiculturalism
Lancaster Site
(DgOv-72)

PROJECT TYPE: Research

LOCATION/SETTING: The Lancaster site is located on a terrace at the mouth of Police Coulee, on the Milk River, in Writing-On-Stone Provincial Park.

METHODOLOGY: Two 2 x 2 m units were situated on the lowest terrace of the Milk River. Excavation was by shovel shaving and troweling in 10 cm arbitrary and natural levels to 2.1 m below surface. Matrix was sieved through 0.63 cm mesh screens in the cultural layers; samples were screened between cultural layers. Hearths in the cutbank were sampled for radiocarbon dating.

RESULTS: Three occupations are present in the upper 50 cm of the deposit as sampled by the excavation units. Diagnostic projectile points and radiocarbon dates indicate that all date to the Late Prehistoric Period. A limited assemblage, including ceramics, was recovered from the site.

SITE TYPE: Buried campsite

REPORT: In preparation

89-22

John H. Brumley
Barry J.Dau
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Medicine Hat, Alberta

Alberta Public Works Supply and Services
Oldman River Dam Project

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The project area encompassed all of the proposed 2,350 ha Oldman River Dam Reservoir and a number of small localities immediately adjacent. Within the project area, the Crowsnest and Castle rivers flow into the Oldman River. Terrain within the project area varies considerably. Along the rims of valleys, it can range from gently sloping to moderately rolling. The valley walls are steep with a number of smaller secondary drainage channels often deeply incised. Valley floors range from rough broken to almost flat. The region is between the prairie and montane ecosystems.

METHODOLOGY: This project involved a variety of ancillary developments not directly associated with the construction of the dam itself. Archaeological work consisted primarily of impact assessments, with small, individual mitigation programs when necessary. Mitigation consisted of the limited feature mapping and auger testing of three sites (DjPm-127, 181 and 234) and the excavation of one stone circle in site DjPm-181.

RESULTS: A total of 17 prehistoric and two historical sites was encountered within the various developments.

SITE TYPES: The prehistoric sites (DjPl-70 and 82, DjPm-33, 42, 46, 80, 102, 109, 127, 134, 138, 181, 234, 235, 236, 243 and 244) consist primarily of surface stone features. The two historical sites (Peter Verigrim House foundation and barn) contain structures that reflect the early Euro-Canadian occupation of the region.

REPORT: Complete, entitled "1989 Oldman River Dam Archaeological Project Ancillary Developments Historic Resources Impact Assessment and Mitigation," by John H. Brumley and Barry J. Dau

89-23

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Alberta Culture and Multiculturalism/
Alberta Transportation
Gravel Pit Extraction Projects

PROJECT TYPE: HRIA

LOCATION/SETTING: Four gravel extraction projects (Russell and MacLeod pits near Fort MacLeod, Foremost No. 3 Pit, and Weed Creek Pit near Cluny) and two secondary roads (SR 587 west of James River Bridge and SR 885:04 crossing of Forty Mile Coulee) were examined. With the exception of SR 587 which lies within the eastern slopes, the remaining project areas lie within the southern Alberta grasslands.

METHODOLOGY: All of the project areas were examined by foot traverse. In the gravel extraction areas, existing pit exposures and gravel test, as well as natural exposures were examined for prehistoric material. Particular attention was paid to evidence for surficial features of prehistoric origin. The entire length of SR 587 was examined. Shovel tests were excavated at the crossings of East Stony and Pekse creeks. Identified sites were also shovel tested.

RESULTS: Nine prehistoric sites (EePe-3 to 11) were identified on the Weed Creek project.

SITE TYPES: Stone circles, cairns, surface scatters

REPORT: Complete, entitled "Historical Resources Impact Assessment Alberta Transportation and Utilities Roads and Highways Projects South," by Gloria J. Fedirchuk

89-24	**Rebecca J. Balcom** **Environmental Management Associates** **1510 - 10 Avenue S.W.** **Calgary, Alberta**	**Blackfoot Band/ Alberta Transportation** **Highway No. 901**

PROJECT TYPE: Historical resources inventory

LOCATION/SETTING: The proposed highway upgrading project passes through approximately 12 km of the Blackfoot Indian Reserve and 9 km beyond the reserve to the east. The alignment will be bounded by Stobart Lake to the north and the Bow River to the south. The terrain is generally flat to gently undulating.

METHODOLOGY: A file search was conducted to ascertain the presence of previously recorded sites within the study area. Two foot traverses were made on either side of the road. Unique features were investigated, but shovel tests were not conducted.

RESULTS: Eight new sites (EfPg-9 to 14, EfPh-2 and 3) were recorded, and one previously recorded site (EfPg-2) was re-evaluated.

SITE TYPES: Isolated finds, lithic scatters, campsite, kill site

REPORT: Complete, entitled "Historical Resources Inventory Proposed Highway No. 901 through the Blackfoot Indian Reserve No. 146, Final Report, Permit 89-24," by Rebecca J. Balcom

89-25

Stanley Van Dyke
Bison Historical Services
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Public Works Supply
and Services
Oldman River Dam

PROJECT TYPE: Mitigation

LOCATION/SETTING: Mitigation was conducted at 12 prehistoric sites (DjPl and DjPm blocks) on the lower Castle, Oldman and Crowsnest rivers, south of Cowley, Alberta.

METHODOLOGY: Archaeological studies involved excavation of surface and buried prehistoric sites according to guidelines set out by the Archaeological Survey of Alberta and the project management for the Oldman River Dam Archaeological Project.

RESULTS: Field studies consisted of the excavation of about 3,923 levels (1 x 1 x 1 m) at 12 prehistoric sites. In two years of excavation, archaeological studies at these sites have resulted in the recovery of 128,079 artifacts, 24.2% of which were unmodified rock and fire-broken rock associated with features. The cultural assemblage was composed of 74,561 pieces of bone, 20,551 pieces of debitage and 1,867 tools.

The artifacts recovered in the course of studies were grouped according to cultural material units (CMUs) on the basis of diagnostic artifacts, cultural and natural stratigraphy, and radiocarbon dates. Two hundred and eighteen CMUs were established.

Fully 93.82% of the artifacts and 89.83% of the tools were associated with CMUs which were assigned to a sub-component. Eighty-four CMUs (38.5%) were assigned to a specific phase. Seventy-one other CMUs were assigned to more general units of analysis (e.g., Late Prehistoric, Middle Prehistoric, Early Prehistoric).

The subcomponents identified in the course of studies include an Alberta Complex subcomponent (± 9,600 years BP), a Mummy Cave Complex subcomponent (7,000-8,000 years BP), a McKean Complex subcomponent (3,500-4,000 years BP), a Pelican Lake Phase subcomponent (2,500-3,500 years BP), a Besant Phase subcomponent (1,150-2,000 years BP), an Avonlea Phase subcomponent (1,150-1,750 years BP). an Old Women's Phase subcomponent (225-1,150 years BP) and a protohistoric subcomponent (110-225 years BP). These assignments are supported by 40 radiocarbon dates and 141 classified projectile points. In addition, six cultural material units were assigned to a separately defined subcomponent (Glacier Park Complex). These units are characterized by the use of fish netsinkers and the occurrence of fish bone. A single radiocarbon date and associated projectile points suggests an age of approximately 1,600 years BP and a relationship to either or both Avonlea and Besant.

Based upon the archaeological studies carried out to date, work has been recommended for 1990. Proposed studies include work directed towards documenting the Plains/Mountain occupation of the valley (7,000-8,000 years BP), to documenting the Mummy Cave Complex occupation of the valley (± 6,000 years BP), to documenting a possible Oxbow occupation (previously unknown in the valley, ± 5,000 years BP), to documenting the poorly known McKean occupation of the valley (± 4,000 years BP), to better documenting the early Pelican Lake occupation of the valley (± 3,600 years BP) to documenting the fish netsinker occupation of the valley (± 1,600 years BP) and towards resolving site specific stratigraphic correlation problems.

SITE TYPES: Campsites

REPORT: Complete, entitled "Section 3.0, 1989 Oldman River Dam Prehistoric Archaeology Mitigation Program - Campsites Component - A.S.A. Permit 89-25, Final Report," by Stanley Van Dyke, Sharon Hanna, Wendy Unfreed and Barb Neal

89-27

Sheila J. Minni
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City of Edmonton
Waste Management
Centre

PROJECT TYPE: HRIA

LOCATION/SETTING: The project covers an area of approximately 320 ha in northeast Edmonton. Topography ranges from flat to rolling. Virtually all of the study area has been cleared and has undergone cultivation for many years. The only areas left with any natural parkland vegetation are the ravines, gullies, terrace edges and any area to low and wet for farming.

METHODOLOGY: Prefield research consisted of an overview of site data files, NTS maps and archaeological and historical reports. In the field, areas with complete surface exposure were surveyed by a series of foot traverses. Shovel tests were done only when historical resources were located. Areas with no surface exposure (wetlands and steep ravine and gully slopes) were considered to have low potential for sites and were not surveyed or shovel tested.

RESULTS: The field survey located 17 prehistoric archaeological sites and two groups of historical standing structures. Although all of the sites will be directly affected by the proposed development, the recording of 18 of the sites has mitigated the potential impact. One site, FjPh-104, is of greater significance and should be removed from the development area or particularly excavated to mitigate development.

REPORT: Complete, entitled "Historical Resources Impact Assessment Edmonton Waste Management Centre," by Sheila J. Minni

89-28

Brian Reeves
ARESCO Ltd.
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Procter and Gamble
Grande Prairie Saw
Mill

PROJECT TYPE: HRIA

LOCATION/SETTING: The project is located in the Manning area, west of the Peace River. The study area covered approximately 320 acres of land on prairie level west of the Peace River and southeast of a glacial spillway channel. The area has been cleared of trees, ploughed and seeded to various crops.

METHODOLOGY: Foot traverses and subsurface testing by shovel and backhoe were conducted as necessary.

RESULTS: One prehistoric site was found in the study area. This site consisted of five separate artifact finds of undatable materials. One historical period site was also found; it was a Hungarian immigrant homestead with two standing buildings dating from ca. 1929.

REPORT: Complete, entitled "Historical Resources Impact Assessment, NW 3 & SW 10-93-23-5, Saw Mill near Manning, Alberta; Final Report, Permit 89-028," by Brian Reeves and Colin Poole

89-29

Jack Brink
Archaeological Survey of Alberta
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Alberta Culture and Multiculturalism
Head-Smashed-In Buffalo Jump

PROJECT TYPE: Research

LOCATION/SETTING: Head-Smashed-In Buffalo Jump is located in southwestern Alberta, on the southern edge of the Porcupine Hills, about 16 km west of the town of Fort Macleod.

METHODOLOGY: Excavations were conducted in the processing area of the site, on the prairie level below the kill. The basic unit of excavation was the 1 x 1 m square, excavated in arbitrary 10 cm levels, usually to a final depth of about 50 cm. All dirt was passed through a 1/4 inch screen. All lithic artifacts larger than 1 cm in length were mapped in three dimensions. All fire-broken rocks longer than 5 cm and all identifiable bones were plotted on map sheets for each arbitrary level. Features were individually excavated and recorded.

RESULTS: An area of about 20 sq. m was excavated during the 1989 field season. This represents an extension of the area excavated during the two previous field seasons, resulting in a contiguous excavation area now covering 44 sq. m. The results obtained were generally similar to those of the previous two years. A high density and large number of bison bones were recovered, along with large numbers of small-sized lithic debitage and tool fragments, and over 870 kg of fire-broken rock. Eleven cultural features were excavated, including six hearths, four pit features and a bone upright.

SITE TYPES: Buffalo jump and associated processing/butchering area

REPORT: In preparation

89-30

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Calgary, Alberta

Chevron Canada Resources
Calais Gas Conservation Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project is situated within the boreal forest immediately east of Grande Prairie, Alberta. With the exception of the intermittent occurrence of peat bogs, the terrain consists of gently rolling uplands, approximately 15% of which has been cultivated. The right-of-way intercepts five unnamed creeks that drain into Sturgeon Lake. The battery is situated on dry upland, north of Sturgeon Lake.

METHODOLOGY: A record review revealed no previous sites in the area. A two-person team conducted a pedestrian survey and an intensive visual examination of the entire Calais Flow Line and Battery Site. All exposures were examined for cultural remains. If cultural material was observed, an intensive inspection of the surrounding area was conducted, and four shovel tests were excavated in the adjacent area to determine if undisturbed remains were present.

RESULTS: One prehistoric site (GgQj-17) was identified.

SITE TYPE: Campsite

REPORT: Complete, entitled "Historical Resources Impact Assessment Chevron Canada Resources Limited Calais Gas Conservation Project," by Fedirchuk McCullough and Associates

89-31

Rebecca J. Balcom
Environmental Management Associates
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Calgary, Alberta

Calgary Winter Club
Country Hills Development

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed developments are situated in the West Nose Creek valley, on the northern periphery of Calgary, north of Nose Hill. The developments encompass an area of approximately 142 ha, most of which has been cultivated.

METHODOLOGY: Fieldwork included foot traverses of the areas to be developed and visual examination of the ground surface and exposures. Shovel tests were excavated as appropriate to search for buried sites.

RESULTS: No sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Country Hills Development Final Report, Permit 89-31," by Rebecca J. Balcom

89-32

Alison Landals
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Alberta Public Works Supply and Services
Oldman River Dam

PROJECT TYPE: Mitigation

LOCATION/SETTING: The Oldman River Dam reservoir is located in the foothills transitional zone in southern Alberta.

METHODOLOGY: Thirteen sites within the reservoir were excavated. Nine sites (DjPm-41, 80, 88, 100, 114, 116, 122, 126 and 222) had been examined previously but required no further mitigative excavation. Four sites (DjPm-24, 50, 201 and 231) were newly mitigated in 1989.

RESULTS: Site types varied from small, transitory kills to buried campsites, stone circles and large kill sites, including one large Pelican Lake communal kill (DjPm-116) and two Late Prehistoric/Protohistoric buffalo jumps (DjPm-80 and 126). It was determined that sites DjPm-24 and 116 would require further mitigative response.

REPORT: Complete, entitled "1989 Oldman River Dam Prehistoric Archaeology Mitigation Program, Kill Sites Component, A.S.A. Permit 89-32, Final Report," by Alison Landals

89-33

Milt Wright
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Alberta Culture and Multiculturalism
Grande Prairie Research Project

PROJECT TYPE: Research

LOCATION/SETTING: Survey and test excavations were conducted in the Grande Prairie region and were focused specifically on remnant glacial lake shoreline features. Heights of land in the Birch Hills, Musreau Lake and Saskatoon Mountain areas which contained former embayments, deltas and peninsular landforms associated with Glacial Lake Peace were assessed.

METHODOLOGY: Private artifact collections and museum holdings in the Grande Prairie region were assessed to determine the distribution of stone tool assemblages. Collections containing early prehistoric tools were plotted on a surficial geology map of the region, and associations with specific landforms were noted. Sampling locations were determined judgementally, based on the above map data, and test excavations were deployed over a variety of palaeolandforms.

RESULTS: Several prehistoric sites were located, but the implementation of the survey was hampered by exceptionally heavy rainfall and dense ground cover. The size of the landforms being assessed made it difficult to gather adequate sample data, and no implications are drawn from negative test results. The difficulties encountered in accessing some areas and density of ground cover suggested that fall surveys may be more fruitful for this type of project.

SITE TYPES: GjQp-3 is a multicomponent site containing a range of Early and Middle Prehistoric tools. These include basally thinned points and a microblade core. The site has been cultivated for many years, and no intact deposits were identified. GhQt-4 is a multicomponent, stratified site within a cliff top dune deposit atop Saskatoon Mountain. The lower level of the site is dated at 8,200 years before present, and debitage was recovered below this dated horizon.

REPORT: In preparation

89-34	**Eric Damkjar** **E.R.D. Heritage Consulting** **7701 - 86 Avenue** **Edmonton, Alberta**	**Associated Engineering** **Blackmud Creek Slope Stabilization Project**

PROJECT TYPE: HRIA

LOCATION/SETTING: The projected area is situated at the confluence of the Blackmud and Whitemud creeks, within the city of Edmonton. The area has been disturbed by a variety of activities.

METHODOLOGY: The entire area was assessed in the field. The steeply sloped north side of the ravine was assessed mainly through inspection of numerous natural exposures caused by erosion and slumping; however, a few small flat areas, possibly terrace remnants, were shovel tested using a judgmental strategy. South of the creek, on the level terrace, a series of bulldozed trails have exposed subsurface deposits. The surface and particularly the edges of these trails were examined, while forested areas between the trails were assessed with shovel holes.

RESULTS: No historical resource sites were located.

REPORT: Complete, *entitled "Historical Resources Impact* Assessment Blackmud Creek Slope Stabilization Project," by E.R.D. Heritage Consulting

89-35

Brian O.K. Reeves
1717 - 10 Avenue S.W.
Calgary, Alberta

Rempel Construction
Beachwood Estates

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed subdivision is located on the cottonwood forested flood plain south of the Highwood River, immediately west of the town of High River. Small, open, grass-covered flats are interspersed throughout the forest. The area has been part of operating ranches since the 1880s. Except for some gravel mining and channelization and diking of Baker Creek, the landscape has been little altered.

METHODOLOGY: A metal detector was employed as the primary prospecting instrument to detect metallic objects and scatters in the open flats and adjacent willow thickets. Selected artifact were shovel tested.

RESULTS: Twelve sites (ElPd-27 to 38) were identified.

SITE TYPES: Historical campsites, possible whiskey post, scattered finds

REPORT: Complete, entitled "Historical Resources Impact Assessment Beachwood Estates, High River, Alberta Final Report," by Brian Reeves

89-36

Brian O.K. Reeves
Lifeways of Canada
1717 - 10 Avenue S.W.
Calgary, Alberta

CLV Water Cooperative
Water Distribution
System

PROJECT TYPE: HRIA

LOCATION/SETTING: The field studies focused on the Michichi Creek crossing which is characterized by a well-developed set of terraces lying within an entrenched stream valley. The terrace edges are well exposed and actively eroding. The area is heavily grazed.

METHODOLOGY: Four areas were examined for the presence of historical resources. Three areas were examined adjacent to the Red Deer River valley. Finds of limited significance were found along the bluffs of the Red Deer River. The pipeline crossing of Michichi Creek was examined in detail.

RESULTS: Six prehistoric sites (EiPd-12 to 14, EiPe-7 and 8 and EjPd-11), one historical site, and scattered palaeontological remains were located. No further work is recommended at any of these sites.

SITE TYPES: Scattered campsites, stone cairns, tipi ring, historical homestead remains

DATES: The historical homestead dates to the 1920s and is associated with the homesteading of SW 27-29-19-4.

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment CLV Water Cooperative Ltd. Proposed Water Distribution System," by Lifeways of Canada Limited

89-37	**Gloria J. Fedirchuk** **Fedirchuk McCullough & Associates Ltd.** **304, 1725 - 10 Avenue S.W.** **Calgary, Alberta**	**City of Calgary Northwest Recreational and Educational Site**

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The proposed project is located on the northern edge of the city of Calgary, in the grassland vegetation zone. The sites are located approximately 4 km north of the Bow River, at the base of a ridge of land that runs between the Bow River and Beddington Creek.

METHODOLOGY: In 1984, an HRIA was undertaken in the project area by Lifeways of Canada Limited on behalf of Melcor Developments Ltd.. At that time, 26 prehistoric sites were identified. The current project represents both the completion of the HRIA requirements at two of the sites (EgPn-185 and 186), as well as completion of mitigative requirements. Ground reconnaissance and shovel testing were conducted.

RESULTS: No additional cultural materials were recovered.

SITE TYPES: Stone circles

REPORT: Complete, entitled "Historical Resources Impact Assessment and Mitigation The City of Calgary Northwest Recreational and Educational Site," by Fedirchuk McCullough and Associates

89-39	**Edward J. McCullough**	**Singleton Associated**
	Fedirchuk McCullough &	**Engineering/Bow River**
	Associates Ltd.	**Pipe Lines**
	304, 1725 - 10 Avenue S.W.	**Gooseberry Lake**
	Calgary, Alberta	**Lateral/Neutral Hills,**
		Gooseberry Lake,
		Consort Extensions

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline projects are situated within the parkland zone. Numerous small lakes occur in the area, most notably Gooseberry and Kneehill lakes.

METHODOLOGY: A site file review was conducted to determine the presence of previously recorded sites in the area. Ground reconnaissance consisted of an intensive examination of the proposed rights-of-way. Subsurface tests were excavated within the proposed rights-of-way in areas where vegetation impeded visibility.

RESULTS: Two prehistoric sites (FaOs-2 and 3) were located on the Gooseberry Lake Lateral. On the Consort Extension one site (FaOq-106) was identified adjacent to the proposed right-of-way. No further studies relative to the proposed project are recommended at any of these sites.

SITE TYPES: Campsite, stone feature, homestead remains

REPORT: Complete, entitled "Historical Resources Impact Assessment Singleton Associated Engineering Ltd. Bow River Pipe Lines Ltd. Gooseberry Lake Lateral, Neutral Hills Extension, Gooseberry Lake Extension, Consort Extension," by Fedirchuk McCullough and Associates

89-40

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
Western Alberta
System Mainline Loop

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline begins just west of Coleman, Alberta and proceeds generally west, climbing to the Alberta/British Columbia border in Phillips Pass.

METHODOLOGY: The right-of-way was walked, and shovel testing was undertaken in selected areas associated with previously known and newly recorded historical resources sites.

RESULTS: Three historical resource sites were identified during the project, a previously known prehistoric site (DjPp-56), a newly recorded prehistoric site (DjPp-69) and a newly recorded historical period site. Direct impact is anticipated at the historical period site only.

SITE TYPES: DjPp-56 is a collection of small finds; DjPp-69 is a small campsite; and the historical period site appears to relate to habitation later than 1915.

DATES: The historical period site likely is more recent than 1915.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment NPS 36 Western Alberta System Mainline Loop - ABC Section," by Thomas Head

89-41

Richard Callaghan
Historical Resource Management
910, 1335 - 12 Avenue S.W.
Calgary, Alberta

Kananaskis Country
Canoe Access and Day

PROJECT TYPE: HRIA

LOCATION/SETTING: The development is located in Kananaskis Country, at the confluence of Elbow River and Canyon Creek.

METHODOLOGY: Foot traverses and subsurface testing were conducted as necessary.

RESULTS: No sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Canoe Access and Day Use Area, Kananaskis Country, SW 15/22/6/W5M Final Report, Permit 89-41," by Richard Callaghan

89-42

Bea A. Loveseth
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Alberta Public Works
Supply and Services
Oldman River Dam

PROJECT TYPE: Mitigation of site DjPm-115

LOCATION/SETTING: The site is in the Crowsnest River valley on a low terrace on the south side of the Crowsnest River at its confluence with the Oldman River. The site was tested in 1988, and further work was recommended. Vegetation consists of mixed grasses, brush and occasional trees.

METHODOLOGY: The site was first tested by a series of 125 (50 x 50 cm) shovel tests, spaced about 10 m apart. Seven stone circles, five surface hearths and two cairns found in 1989 were mapped and auger-tested. In addition, six block excavations were undertaken in culturally rich areas of the site. These comprised Area A (10 sq. m), Area B (10 sq. m), Area C (17 sq. m), Area D (14 sq. m), Area E (22 sq. m) and Area F (15 sq. m). The depth of excavations ranged from 10 to 70 cm below surface.

RESULTS: Analysis of the cultural material recovered is still underway, but quantities recovered were immense. As an example, in Area A, 4,844 artifacts were recorded. The majority, about 95%, were fragmented bone. The amount will be equal or greater in all the other five areas. Noteworthy items included ceramics, finely made bone tools, including awls and an arrow shaft straightener, and beads of shell, bone, glass and seeds. In addition to bison bone, a great deal of non-bison remains were included, as was foetal bone. Non-bison bone included deer, elk, canid, bird and beaver.

DATES: Based on trade items, ceramics and projectile points, the site ranges from Avonlea to the protohistoric. Point types identified at DjPm-115 include Plains triangular and Plains Side-notched. The site represents intensive use in the Late Prehistoric Period.

REPORT: In preparation

89-43

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Ammonite Gem Company
Sec. 13, Tp. 14, Rg. 21 W4M

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed open pit ammonite mine is located approximately 30 km southeast of Champion, Alberta, near the headworks of Travers Reservoir. The development will directly impact a small area of approximately a single hectare.

METHODOLOGY: File searches were carried out to identify the location and types of sites previously located in the area. The proposed development area was examined in the field, focusing on existing surface exposures. Shovel testing was used to supplement the surface exposures.

RESULTS: One historical resource site (EbPe-10) was identified outside the proposed development.

SITE TYPE: Prehistoric cairn

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Ammonite Gem Company Ltd. Sec. 13, Tp. 14, Rg. 21, W4M ASA Project Number 89-43," by Thomas Head

89-44

Rebecca J. Balcom
Environmental
Management Associates
1510 - 10 Avenue S.W.
Calgary, Alberta

Alberta Public Works
Supply and Services
Oldman River Dam

PROJECT TYPE: Mitigation

LOCATION/SETTING: The Oldman River Dam is located in the foothills transitional zone in southern Alberta.

METHODOLOGY: Six sites within the reservoir were excavated. All six had been identified in 1985 and, at that time, were suggested for mitigation.

RESULTS: The site types included homesteading and ranching remains (DjPm-237, 238, 239 and 242), a communal Doukhobour settlement (DjPm-241), and a turn of the century dairy operation (DjPm-240).

REPORT: In preparation

89-46

Stanley Van Dyke
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Cooney Oil and Gas
Grand Forks Well Site

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The proposed well site and associated access road are located on a high terrace above Forty Mile Coulee, southwest of Bow Island Alberta.

METHODOLOGY: File searches were conducted of historical and prehistoric inventory records. Field studies consisted of a comprehensive foot traverse of the well site and a linear traverse of the access road. This was followed by shovel testing of the well site and areas of potential along the access road.

RESULTS: Three prehistoric stone circle sites (DjOu-83, 84 and 85), containing a minimum of 14 stone circles, were identified. Mitigation consisted of mapping the stone circles along the access road (n=4).

SITE TYPES: Stone circles

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Cooney et al Grand Forks 10-15-8-11 ASA Project Number 89-46," by Stanley Van Dyke

89-47 **Cancelled**

89-48

Brian O.K. Reeves
ARESCO Ltd.
P.O. Box 1174, Station G
Calgary, Alberta

Universal Explorations
Drumheller Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The project is located in the Rosedale area, northeast of the Red Deer River. The study area consisted of approximately 6 acres of land, situated on the valley floor and in a side coulee, tributary to the Red Deer River. Located northeast of the river and on the abandoned CPR roadbed, the area has been extensively modified by mining activity.

METHODOLOGY: Foot traverses and subsurface testing were employed as necessary.

RESULTS: No prehistoric sites were located in the study area. Much evidence of recent coal and shale mining activity was observed, but no historical remains of significance will be impacted.

REPORT: Complete, entitled "Historical Resources Impact Assessment, SW & SE of NW, NW & NE of SE of 28-28-19-4, Unex et al. Drumheller Well Site near Rosedale, Alberta; Final Report, Permit 89-048," by Brian Reeves and Colin Poole

89-51

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

TransAlta Utilities North Lethbridge to Tempest Transmission Line

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed transmission line is situated in the mixed prairie phytogeographic region. The portion of the line requiring assessment parallels the east bank of the Oldman River. The proposed right-of-way traverses primarily flat terrain, except for the crossing of one prominent coulee. Approximately 70% of the project area has been cultivated or used as pasture.

METHODOLOGY: A record review was conducted of the site files at the Archaeological Survey of Alberta. The entire development zone was traversed on foot. All fortuitous exposures were examined, and subsurface tests were excavated in areas where surficial disturbance was minimal or non-existent.

RESULTS: The HRIA resulted in the identification of two previously recorded sites (DkPe-15 and 54) and one newly recorded site (DkPe-59).

SITE TYPES: Isolated finds, campsite

REPORT: Complete, entitled "Historical Resources Impact Assessment TransAlta Utilities Corporation North Lethbridge (370S) to Tempest (403S) 138 kV Transmission Line 820L," by Fedirchuk, McCullough and Associates

89-52

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Oslo Project Historical Resources Phase 1: Baseline Study

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The Oslo Project is a proposed commercial oil sands development located on a portion of Oslo Lease No. 31, near Kearl Lake, about 60 km north of Fort McMurray. It lies within the Clearwater Lowland, an area characterized by coarse, well-drained sands and gravel outwash deposits.

METHODOLOGY: The study consisted of a site file search, literature review and field reconnaissance of the 1988-1989 core-hole drilling program and fortuitous exposures observed during an aerial overflight.

RESULTS: Five previously recorded sites (HhOt-1, HhOu-11 to 14) occur within the area; two newly recorded sites (HhOs-1 and HhOu-34) were identified during the ground reconnaissance.

SITE TYPES: Artifact scatters, isolated finds

REPORT: Complete, entitled "Historical Resources Phase 1: Baseline Study Oslo Project," by Fedirchuk, McCullough and Associates

89-53	**Brian Kooyman** **Dept. of Archaeology** **University of Calgary** **Calgary, Alberta**	**University of Calgary** **Head-Smashed-In** **Buffalo Jump**

PROJECT TYPE: Research

LOCATION/SETTING: Head-Smashed-In Buffalo Jump (DkPj-1) is located on the eastern slope of the Porcupine Hills of southwestern Alberta, about 16 km west of the town of Fort Macleod.

METHODOLOGY: During August, 1989, a four-year excavation project was begun in a 36 sq. m area in the north kill at Head-Smashed-In Buffalo Jump. All excavation was by trowel, and all material was screened through 1/4 inch mesh screen, with the exception of five units (nos. 1, 9, 19, 21 and 29) which were screened using 1/8 inch mesh screen.

RESULTS: Over 500 identifiable bone fragments and over 300 lithic items were recovered. The lithic tool assemblage was dominated by projectile points and small cutting tool broken edge fragments. Lithic debitage was characterized by small sharpening/resharpening flakes. The faunal remains were almost entirely bison, but three rodent species were also identified. No features and little fire-broken rock were found. The overall pattern suggested a primary butchering area associated with a kill at the site, but the evidence was not unequivocal.

REPORT: Complete, entitled "Final Report of the 1989 Excavation in the North Kill at Head-Smashed-In Buffalo Jump (DkPj-1)," by Brian Kooyman

89-54

Brian O.K. Reeves
ARESCO Ltd.
P.O. Box 1174, Station G
Calgary, Alberta

Canadian Western
Natural Gas Company
Oldman River
Crossing Replacement
Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: The project is located in the Diamond City vicinity, east of the Oldman River. The study area consisted of approximately 3 ha of land on the valley floor and wall and on prairie level east of the Oldman River. The area has been used for agriculture and previous pipeline routes.

METHODOLOGY: Foot traverses and subsurface testing were employed as necessary.

RESULTS: No palaeontological or prehistoric sites were located on the project. Debris relating to nearby coal mines and to early pipeline construction was observed but was not considered to be of value.

REPORT: Complete, entitled "Historical Resources Impact Assessment, NW 29 & N 30-9-21-4, Main Line - Oldman River Crossing Replacement Pipeline near Diamond City, Alberta; Final Report, Permit 89-054," by Brian Reeves and Colin Poole

89-56

Eugene M. Gryba
3, 346 - 4th Avenue N.E.
Calgary, Alberta

Dr. George
Preservation Society/
Alberta Culture and
Multiculturalism
George/Kemp House

PROJECT TYPE: HRIA

LOCATION/SETTING: Site FaPl-4 is a conspicuous historical house built in 1893 by Dr. Henry George on a prominent knoll on the south side of a small lake in Innisfail. The building was sold in 1908 to William Kemp and used as a residence and boarding house until the 1960s. Work on renovating the structure, which was designated a Provincial Historic Site in 1977, and upgrading the grounds was initiated in 1989.

METHODOLOGY: The lot was tested by 23 selectively located shovel tests. Salvage excavations of around 7 sq. m were conducted at a part of the buried refuse dump which faced potential impact during restoration of the building foundation.

RESULTS: Shovel tests disclosed a sparse scattering of historical refuse on the northeast and west sides of the house and a major buried refuse area extending away from the northwest corner of the structure. A black chert percussion flake and 2,401 historical items were recovered from the shovel tests and salvage excavations. Among the historical items were sherds of coarse earthenware and fine porcelains, fragments of window and bottle glass, square and round nails, metal containers, bits of plastic, spent shell casings, and other abandoned domestic objects, plus mammal, fowl and fish bones.

REPORT: Complete, entitled "HRIA of the Dr. George/Kemp Historic House in Innisfail, Alberta," by Eugene M. Gryba

89-57

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
North Lateral Loop #2

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The development area lies on the Alberta plains. Shallow surface sediments are dominant and consist of wind- or water-deposited sediments derived from the underlying glacial drift.

METHODOLOGY: A single prehistoric site was identified within the proposed alignment by survey staff of NOVA Corporation. The single feature was tested and mapped. Based upon this work, verbal construction clearance was granted.

RESULTS: One small, prehistoric site (EgOv-5) was located.

SITE TYPE: Stone circles

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment and Mitigation North Lateral Loop #2 ASA Project Number 89-57," by Thomas Head

89-58

Stanley Van Dyke
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Steiert Enterprises
Rural Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The study area consisted of approximately 16 ha of sloped and level terraced land along Springbank Creek, west of Calgary.

METHODOLOGY: A surface transect survey was conducted, and 24 shovel tests were excavated, primarily on low terraces along the creek bank and on level terraces above the creek.

RESULTS: No prehistoric sites were identified.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Rural Sub-Division S 1/2 of LSD 9 and S 1/2 of LSD 10 NE quarter 21-24-3-W5M ASA Permit Number 89-58," by Stanley Van Dyke

89-59

Stanley Van Dyke
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
Flat Lake Lateral Loop
No. 2

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline, 27.6 km in length, runs in a SSE direction and crosses the North Saskatchewan River in LSD 8, Section 34-58-16-W4M.

METHODOLOGY: Field survey consisted of a transect survey of the entire right-of-way. Shovel tests were carried out judgmentally in areas of moderate and high archaeological potential.

RESULTS: Five prehistoric sites were identified in disturbed areas. These include a lithic scatter containing a Samantha projectile point (GaPb-23), an isolated projectile point (FlPb-1), two small finds in cultivated fields (GaPb-20 and 21), and an isolated flake in a shovel test (GaPb-22). Based on additional shovel testing, it was determined that the sites were isolated occurrences and/or small diffuse distributions of previously disturbed artifacts.

SITE TYPES: Lithic scatter, isolated finds

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Flat Lake Late. Loop #2," by Stanley Van Dyke

89-60

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
Stanmore Lateral Loop/Youngstown Lateral Loop/Stanmore South Lateral Loop #2

PROJECT TYPE: HRIA

LOCATION/SETTING: The three proposed pipelines are located south and east of Hanna, Alberta. Each project involves the looping of an existing line with varying construction parameters for each. The Stanmore Lateral will impact an area in excess of 60 ha, including the Berry Creek crossing and the crossing of an unnamed tributary to Berry Creek. The Youngstown Lateral Loop will affect approximately 26 ha of land, including a new crossing of Berry Creek. The Stanmore South Lateral Loop #2 will impact approximately 2 ha. The majority of the alignments are in areas of either native grassland or pasture.

METHODOLOGY: Searches of inventory records were conducted to identify previously recorded sites in the area. Each of the alignments was examined in the field, focusing on existing exposures. Shovel testing was undertaken in areas which lacked surface exposures and where the potential for sites was felt to be moderate or high.

RESULTS: Thirteen prehistoric sites (EhOv-10 to 12, EiOv-8 to 15, and EjOv-3 and 4) and one palaeontological collection were identified along or adjacent to the Stanmore Lateral Loop. Seven prehistoric sites (EjOt-4 and 5, EjOu-2, 4, 5 and 6, and EjOv-5 and 6) and one historical site were identified along the Youngstown Lateral Loop. A single prehistoric site (EiOv-16) was identified during the HRIA of the Stanmore South Lateral Loop #2.

SITE TYPES: Campsites, stone circles, lithic scatters, small finds, isolated finds, palaeontological collection, historical building foundation

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Stanmore Lateral Loop, Youngstown Lateral Loop, Stanmore South Lateral Loop #2 ASA Project Lumber 89-60," by Thomas Head

89-61

Stanley Van Dyke
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
Ferintosh and
Ferintosh North
Lateral Loop Pipelines

PROJECT TYPE: HRIA

LOCATION/SETTING: Ferintosh and Ferintosh North Lateral Loop pipeline rights-of-way encompass approximately 49 ha (37.6 km in length) and traverse the Samson and Red Deer lakes area, approximately 17.5 km east and 1.6 km north of Ponoka, Alberta. The rights-of-way intersect two unnamed seasonal streams and one ditch. Only 3.2 km of the alignment is disturbed.

METHODOLOGY: Transect survey was conducted of alignment with shovel testing of potential site locations, particularly in undisturbed segments of the rights-of-way.

RESULTS: During the course of the archaeological study, seven new prehistoric sites were identified. These include two isolated finds (a point and a biface) located outside the proposed right-of-way (FePh-7 and 8) and five prehistoric sites along the proposed alignment. These include an isolated find (FePg-15) and three small finds (FePg-14, 16 and 17) on the Ferintosh line and a small find (FePg-18) on the Ferintosh North Lateral Loop. Cultural material consisted primarily of quartzite debitage, a small number of quartzite cores, and an isolated quartzite biface.

SITE TYPES: Isolated and small finds and a lithic scatter

REPORT: Complete, entitled "Final Report, Historic Resources Impact Assessment, Ferintosh and Ferintosh North Lateral Loop Pipelines, ASA Permit 89-61," by Stanley Van Dyke

89-62

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

L.L. & E. Alta Inc.
Alltalle et al.
Grand Forks Well Site

PROJECT TYPE: HRIA

METHODOLOGY: The proposed well site is situated on the northern rim of the South Saskatchewan River valley, just downstream of the confluence of the Bow and Oldman rivers.

METHODOLOGY: The entire surface of the proposed well site and its access road were examined by foot traverse surveys using linear or zigzag transects 5-10 m in width. All natural exposures were examined for the presence of buried cultural materials. Shovel testing was also employed adjacent to the identified site.

RESULTS: During the course of the HRIA, a single, previously recorded surface stone feature site, DlOv-10, was identified and examined. No diagnostic material was found at the site. The proposed well site was relocated to avoid the identified site.

SITE TYPES: DlOv-10 is a surface stone feature containing 15 poorly defined stone circles.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Wellsite North of Burdett, Southeastern Alberta - ASA Permit 89-62," by Barry J. Dau

89-63	**Gloria J. Fedirchuk** **Fedirchuk McCullough & Associates Ltd.** **304, 1725 - 10 Avenue S.W.** **Calgary, Alberta**	**Alberta Power Limited/ TransAlta Utilities Anderson-Ware Junction Transmission Line**

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed transmission line is situated within the grassland vegetation region. Few trees occur naturally in this region except in river and coulee bottoms. The Red Deer River forms the most prominent topographic feature in the study area. None of the development zones identified for assessment has been disturbed by cultivation.

METHODOLOGY: Site files were searched to identify historical resources previously located in the area. Ground reconnaissance, consisting of a pedestrian traverse and intensive visual examination of the proposed right-of-way, was conducted by two archaeologists. Where surficial exposures were rare, shovel tests were excavated.

RESULTS: Eight previously recorded prehistoric sites (EfOx-7, 10 to 15 and EgOw-3) were revisited and reassessed. One additional prehistoric site (EfOx-16) was discovered. Two previously recorded historical sites (APS 11 and 12) were also relocated and reassessed relative to the proposed project.

SITE TYPES: Stone features, campsite, historical foundation remains

REPORT: Complete, entitled "Historical Resources Impact Assessment Alberta Power Limited/TransAlta Utilities Corporation Anderson-Ware Junction 240kV Transmission Project," by Fedirchuk McCullough and Associates

89-64

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Singleton Associated Engineering/Bow River Pipe Lines
Throne North Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The study area is located in both the parkland region and the southern grassland in east central Alberta. The main physical features in the vicinity of the proposed project are the Battle River to the north and Ribstone Creek to the east. The proposed right-of-way intercepts seven unnamed creeks, most of which are tributaries of Ribstone Creek.

METHODOLOGY: A search of site survey records was conducted to determine the presence of previously recorded sites in the development area. In addition, a pedestrian traverse of the entire right-of-way was undertaken. Fortuitous exposures were examined for evidence of prehistoric cultural materials, and shovel tests were excavated in selected areas.

RESULTS: Three prehistoric sites (FaOt-1, FbOt-18 and 19) were identified during the ground reconnaissance.

SITE TYPES: Isolated finds, campsite

REPORT: Complete, entitled "Historical Resources Impact Assessment Singleton Associated Engineering Ltd. Bow River Pipe Lines Ltd. Throne North Project," by Fedirchuk McCullough and Associated

89-65

Barry Newton
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Alberta Culture and Multiculturalism
First Albertan's Project

PROJECT TYPE: Two year research, inventory

LOCATION/SETTING: Canmore to Morley Flats area of the Upper Bow River drainage system to the east of Banff National Park.

METHODOLOGY: Prefield air photo interpretation was combined with specific locale identification based on surficial geology maps and available site inventory data. Field studies in 1988 involved examination of available exposures on alluvial fans and re-evaluation of several previously recorded sites. The 1989 field work included a boat survey of the Bow River, re-evaluation of previously recorded sites, followed by limited backhoe testing on five sites.

RESULTS: In 1988, four new sites (EgPt-17, EgPs-46, 47 and 48) were recorded, and two previously recorded sites (EgPt-3 and EgPu-3) were re-evaluated. Sites EgPs-46, 47 and 48 represent stratified, multicomponent, buried campsites located on an alluvial fan on the south side of the Bow River, East of Lac Des Arcs. Charcoal matrix samples associated with bone and artifacts from various levels within a palaeosol below the tephra at EgPs-48 returned dates between 7,040 ± 360 years BP and 8,250 ± 130 years BP.

Re-evaluation of site EgPt-3 resulted in the discovery of bison bone below the tephra, which subsequently was dated to 7810 ± 120 years BP, as well as additional bone fragments and FBR in a weak palaeosol also below the tephra.

At EgPt-17, three 50 x 50 cm test units produced FBR and fragmented bison bone in two separate strata, ca. 35-40 cm and ca. 50-60 cm below surface. The depositional matrix at EgPt-17 is similar to that at EgPt-3, deep aeolian deposits, but at EgPt-3 it was not possible to determine either the total depth of the deposit or the number of occupations present at the site in 1988.

EgPu-3 was recorded by Reeves in 1971; he reported the presence of FBR and hearths exposed in an actively eroding cutbank ca. 1 m below surface and above a layer of Mazama tephra. No cultural occupations were observed at the site when it was examined in 1988.

In 1989, survey of the river bank by boat resulted in the discovery of five new sites (EgPs-51, 52, 53, EgPu-19 and 20). EgPu-19 and 20 are stratified, multicomponent sites, containing occupations in aeolian matrix above a presumed Mazama tephra. EgPs-51 is a stratified, multicomponent bison kill which produced a basal date of 7,110 ± 160 years BP. EgPs-52 produced fragmented bison ribs from an aeolian deposit at the toe of an alluvial fan. No cultural material was found in association with the bone. Site EgPs-53 represents a buried campsite on a rock knoll downstream from site EgPs-51. Occasional flakes, bone fragments and fire-broken rocks were observed in a ca. 1 m deep aeolian deposit covering the bedrock. Backhoe tests were dug at EgPs-47/48, EgPt-4, 6 and 17. Backhoe testing on EgPs-47/48 confirmed the widespread occurrence of the culture bearing palaeosol observed below the tephra in 1988. Additionally, a deeper palaesol was discovered which did not contain evidence of cultural occupations but did produce dates of 9,320 ± 390 years BP and 11,680 ± 250 years BP, indicating the presence of an early landform with potential for cultural occupations.

Testing of EgPt-17 identified at least three occupations in an aeolian matrix over 4 m thick at its deepest. An occupation was identified below a distinct tephra at the site which produced a date of 6,720 ± 80 years BP on bone.

Of the five backhoe tests at site EgPt-6 in 1989, three produced cultural material in quantity below the tephra. Bone samples from below the tephra returned dates ranging from 7,810 +_ 116 years BP to 7,380 +_ 120 years BP.

Three backhoe tests were placed into site EgPt-4. The first, located on the flats at the toe of a steep alluvial fan, produced bone at depths of 1.2 m below surface, and the aeolian deposit ended at 4.75 m on clays believed to represent a former lake bed. The other two backhoe tests were placed into the fan proper and failed to produce any cultural material.

REPORT: In preparation

89-66	**Thomas Head** **Bison Historical Services** **3, 227 - 14 Street N.W.** **Calgary, Alberta**	**NOVA Corporation** **Pipeline Survey**

PROJECT TYPE: Mitigative excavations, EjOv-3

LOCATION/SETTING: This site is on the north side of an unnamed tributary to Berry Creek. It is south and east of Hanna, Alberta.

METHODOLOGY: Limited excavations were undertaken along the area of the proposed development. Concentrations of cultural material previously identified were all off the right-of-way, and only limited material was found in the zone of impact.

RESULTS: Scattered cultural material was recovered from limited excavations. Two concentrations of lithic material were shown to be just outside the zone of impact, and work was not continued on them. A selection of tools and other lithic items were submitted for blood residue analysis. Results indicate the presence of blood from *Bos* and *Cervidae*.

SITE TYPE: EjOv-3 is a small, shallowly buried campsite. Various activities are suggested, including the processing of large ungulates and the reworking of stone tools.

REPORT: In preparation

89-67

Walt Kowal
Walt Kowal Consulting
6816 - 105A Street
Edmonton, Alberta

Dow Chemical Canada
Fort Saskatchewan
Plant Site Expansion

PROJECT TYPE: HRIA

LOCATION/SETTING: The study area encompasses 56.65 ha, most of which is farmland. Approximately 40% of the area is in pasture, while the remainder is divided between a sandy dune area, aspen pine treed areas and low lying grassy sloughs.

METHODOLOGY: In-field investigations consisted of intensive foot traverses of the proposed development area. Visual examination was augmented by shovel tests at regular intervals over the entire site, and 1 m deep test pits were excavated in areas of high potential.

RESULTS: One previously reported site (FkPg-1) was revisited, and an updated site report was completed. Three new archaeological resource sites (FkPg-87, 88 and 89) were located; all were lithic scatters. One historical site was recorded, and the detailed occupation history was ascertained. It was recommended that development be allowed to proceed.

REPORT: Complete, entitled "Historical Resources Impact Assessment Dow Chemical Canada Inc. Expansion Project," by Walt Kowal

89-68

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Tetreau & Associates
Princess Joint Venture

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline is situated within the grassland vegetation region. The Red Deer River forms the most prominent topographic feature in the study area. The valley break to the Red Deer River lies immediately adjacent to the proposed development zones on the west, while Jack Knife Coulee lies to the south and east.

METHODOLOGY: Ground reconnaissance consisted of a pedestrian traverse and intensive visual examination of the well site locations, the proposed access roads and the pipeline rights-of-way. Exposures were provided by ploughed surfaces, existing trails, rodent burrows, wind- and water-eroded surfaces and previous disturbance associated with well site and pipeline construction adjacent to the proposed development zone. Subsurface testing was undertaken where exposures were rare.

RESULTS: One prehistoric site, EeOv-39, was identified. One of the two stone features in this site is located within a proposed flowline right-of-way. Avoidance was recommended, and the proposed right-of-way was rerouted.

REPORT: Complete, entitled "Historical Resources Impact Assessment Tetreau & Associates Ltd. Princess Joint Venture 1989 Development Program," by Fedirchuk McCullough and Associates

89-69

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Alberta Transportation
and Utilities
1989 Highway Survey

PROJECT TYPE: HRIA

LOCATION/SETTING: The Pembina Resource Road runs roughly south from Edson, while the Berland Resource Road runs west from Fox Creek to Grand Cache.

METHODOLOGY: Preselected sections of both alignments were examined on foot.

RESULTS: Approximately 12 km of the proposed Berland Road were examined, but no resource sites were examined. A further 13 km of the proposed Pembina Resource Road were examined. Seven prehistoric sites (FhPc-1, FiQc-1 and 2, and FjQd-4 to 7) were identified. Work was recommended and subsequently undertaken at FiQc-1 and 2 and FjQd-5.

SITE TYPES: Lithic workshops, isolated finds, campsite

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Berland/Pembina Resource Roads (ASA Permit No. 89-69)," by Thomas Head

89-70

Sheila J. Minni
15104 - 97 Avenue
Edmonton, Alberta

Qualico Developments
Regency Park
Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The study area consisted of approximately 32 ha located in the southeast corner of the town of Sherwood Park. Topography ranged form gently to steeply rolling. Approximately 11 ha of the area were treed, and 21 ha were covered by grass and shrubs. A dirt track was evident through the eastern edge of the study area.

METHODOLOGY: Pre-field research consisted of an overview of site data files, NTS maps and archaeological and historical reports. The study area was surveyed by an unstructured foot traverse supplemented by surface inspection of all exposures and five excavation units in areas considered to have medium to high potential for sites.

RESULTS: One group of historical standing structures (a house, two house trailers and four associated buildings) were located. No further work is recommended on these structures.

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Regency Park Residential Subdivision Sherwood Park," by Sheila J. Minni

89-71

James A. Light
Historical Resource Management
910, 1335 - 12 Avenue S.W.
Calgary, Alberta

Canadian Roxy Petroleums
Ronalane 3-16-13-12-4 Well Site

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The well site is located at prairie level above the Bow River in the Grand Forks area.

METHODOLOGY: The development area was walked and shovel tested. A site map was prepared which located the development, cultural features, and shovel tests. After recommendations were made to the Archaeological Survey, a return visit was made to the site to excavate 18 sq. m. Excavations were done by shovel shaving and all matrix was screened. The site area and cultural features were mapped in detail. Tipi rock depths were measured when removed.

RESULTS: Four cultural features were found on the surface at EaOv-6. One ring and one cairn were test excavated. Two partial rings were avoided. Fifty-five artifacts were recovered, including one uniface, one spokeshave, and a cobble chopper. Lithic materials were locally available cobble quartzites and pebble cherts. No diagnostic artifacts were recovered.

REPORT: Complete, entitled "Historical Resources Impact Assessment and Mitigation at EaOv-6, Final Report, Permit 89-71," by James Light

89-73

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Cabre Exploration
Cabre et al.
Provost Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site is situated on the western rim of the shallow coulee containing Ribstone Creek.

METHODOLOGY: The entire surface of the proposed well site and its access road were examined by foot traverse surveys using linear or zigzag transects 5-10 m in width. All natural exposures were examined for the presence of buried cultural materials.

RESULTS: A single surface stone feature site (FbOr-73) was recorded within the proposed well site. No diagnostic materials were found at the site. The well site was relocated to avoid the identified site.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Wellsite near Czar, South-central Alberta - ASA Permit 89-73," by Barry J. Dau

89-74

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

Roan Resources
Roan et al.
Elkwater Well Site

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The proposed well site and its associated access road are situated on hilly terrain which forms part of the western rim of Medicine Lodge Coulee. The coulee forms the western boundary of the Cypress Hills.

METHODOLOGY: The first phase of the program was the assessment of the proposed well site and its approximately 1,700 m long access road. All developments were examined by foot traverse surveys using linear or zigzag transects 5-10 m in width. All natural exposures were examined for the presence of buried cultural materials. The second phase of the project was a brief mitigation program at one of the two surface stone feature sites (DjOo-49) recorded during the assessment phase. Mitigation consisted of a detailed surface collection of all cultural material within the portion of the site that will be affected by the proposed access road. In addition, 5 sq. m were excavated at various locales in the site.

RESULTS: During the HRIA portion of the project, two previously unrecorded surface stone feature sites (DjOo-48 and 49) were identified. Site DjOo-48 is outside of the examined well site and will not be impacted. During mitigation at site DjOo-49, 310 pieces of cultural material were recovered. Only one was diagnostic. It consists of a small pottery sherd, suggesting occupation of the site sometime during the Late Prehistoric Period.

REPORT: Complete, entitled "An Historic Resources Impact Assessment and Mitigation Program at a Proposed Gas Wellsite West of Cypress Hills Provincial Park, Southeastern Alberta - ASA Permit 89-74," by Barry J. Dau

89-76

G.S.L. Stuart
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Chevron Canada Resources
High Prairie Well Site and Access Road/ Valleyview Well Site and Access Road

PROJECT TYPE: HRIA

LOCATION/SETTING: The High Prairie and Valleyview well sites and access roads are situated within the boreal forest, east of Peace River, Alberta. The development zones of the Valleyview well site and access road had been cleared previously.

METHODOLOGY: A pedestrian survey and intensive visual examination of the proposed well sites and access road rights-of-way were conducted. All exposures were examined for cultural remains. Judgmental shovel tests were conducted in the forested uplands of the High Prairie well site and the grassy areas of the Valleyview well site and access road.

RESULTS: One prehistoric site (GgQj-18) was identified during the ground reconnaissance.

SITE TYPE: Artifact scatter

REPORT: Complete, entitled "Historical Resources Impact Assessment Chevron Canada Resources Limited High Prairie Well Site and Access Road Valleyview Well Site and Access Road," by Fedirchuk McCullough and Associates Ltd.

89-77

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

CEP Consultants/
Elbow Valley
Development Corp.
Elbow Valley Golf and
Polo Club

PROJECT TYPE: HRIA

LOCATION/SETTING: The development project includes approximately 450 ha of raw land along the Elbow River, southwest of the city of Calgary. The Elbow River meanders across the northern portion of the study area. It is, in turn, flanked by broad gravel flood plain terraces on either side. The terraces are bordered by prominent ridges which rise sharply 25-50 m from the flood plain before leveling out into gently rolling terrain.

METHODOLOGY: File searches were carried out to identify the location and types of sites previously recorded in the area. A preliminary field overview was conducted in July, 1989. Subsequently, project areas were examined in more detail by foot traverses and shovel testing. Finally, deep backhoe testing was undertaken in portions of the study area.

RESULTS: Seventeen prehistoric sites (EgPn-101 to 108, 110, 111, 121, and 328 to 333) and two historical sites (EgPn-100 and 109) were located. While the majority of these are of limited significance, four sites (EgPn-108, 111, 131 and 132) are considered significant enough to warrant additional work if impact cannot be avoided.

SITE TYPES: Kill sites (n=2), surface scatters (n=10), campsites (n=3), isolated finds (n=2), historical farm/barn, historical farmstead

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Elbow Valley Golf and Polo Club ASA Permit No. 89-77," by Thomas H. Head

89-78

Heinz W. Pyszczyk
Archaeological Survey of Alberta
8820 - 112 Street
Edmonton, Alberta

Old Strathcona Society
Street Repair

PROJECT TYPE: Archaeological salvage/mitigation

LOCATION/SETTING: The site is located in Old Strathcona, immediately north of 83 Avenue and west of 103 Street. The setting is very urban.

METHODOLOGY: The site was located by a series of narrowly spaced foot traverses. The site was mapped and photographed, and the single artifact, a 1905 manhole cover, was removed.

RESULTS: One 1905 manhole cover was recovered and a brick-lined manhole beneath it was exposed.

SITE TYPE: Historical urban site

REPORT: In preparation

89-79

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

SaskOil
SaskOil Middle Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site and its associated access road are situated on rolling terrain along the western rim of the coulee containing Middle Creek. The well site is located south of Cypress Hills Provincial Park.

METHODOLOGY: The entire surface of the proposed well site and its access road were examined by foot traverse surveys using linear or zigzag transects 5-10 m in width. All natural exposures were examined for the presence of buried cultural materials. Shovel testing was also employed at well center.

RESULTS: No historical resources sites were found within or adjacent to the examined developments.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Wellsite South of Cypress Hills Provincial Park, Southeastern Alberta - ASA Permit 89-79," by Barry J. Dau

89-80

Barry J. Dau
Ethos Consultants Ltd.
Box 20, Route 5
Medicine Hat, Alberta

L.L. & E. Alta Inc.
L.L. & E. et al.
Bow Island Well Site

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site is situated on the northern rim of the South Saskatchewan River valley, downstream from the confluence of the Bow and Oldman rivers.

METHODOLOGY: The entire surface of the proposed well site and its access road were examined by foot traverse surveys using linear or zigzag transects 5-10 m in width. All natural exposures were examined for the presence of buried cultural materials. Shovel testing was also employed adjacent to the identified site.

RESULTS: During the course of the HRIA, a single surface stone feature site (DlOv-11) was found within and adjacent to the proposed well site. No diagnostic cultural materials were found at the site. The proposed well site was relocated to avoid the identified site.

SITE TYPES: Site DlOv-10 contains eight stone circles.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of a Proposed Wellsite Northeast of Grassy Lake, Southeastern Alberta - ASA Permit 89-80," by Barry J. Dau

89-81

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
Pipeline Survey

PROJECT TYPE: Mitigative excavations, EdPd-22

LOCATION/SETTING: This site is in an area of hummocky moraine west of the Majorville Medicine Wheel.

METHODOLOGY: Limited excavations were undertaken along an access road into a proposed pipeline development. Scattered ceramic sherds and lithic remains were collected from the area previously. Excavations were undertaken in the area from which the materials had been collected. A further small assemblage was collected, but it did not warrant completion of the recommended program of work. Excavations were terminated early with the approval of the Archaeological Survey of Alberta.

RESULTS: Scattered cultural material was recovered from limited excavations. Included are a small assemblage of ceramic sherds, lithic debitage and small, weathered bone fragments.

SITE TYPE: EdPd-22 is a small site likely relating to short-term summer used based upon the limited cultural assemblage.

DATE: Late Prehistoric use is suggested by the ceramic assemblage.

REPORT: In preparation

89-82

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Alberta Public Works
Supply and Services
Reservoir Survey

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed reservoir is located at the confluence of the Little Bow River and Mosquito Creek, southeast of Nanton, Alberta.

METHODOLOGY: Areas beneath the full supply level were examined by foot surveys, supplemented by shovel testing.

Backhoe testing was then undertaken to assess areas with deep sediments. A limited number of the sites were then assessed through the excavation of 1 x 1 m test units.

RESULTS: A total of 124 prehistoric and 14 historical period locales was identified. One hundred and thirty-six backhoe tests and 23 1 x 1 m units were dug. Quantities of cultural material were recovered. Work is recommended at 26 of the sites and possible at others.

SITE TYPES: The prehistoric sites include one cairn, four lithic scatters, six isolated finds, four buried campsites, seven kill sites, 13 campsites, 48 disturbed campsites and 41 stone circle sites. The 14 historical site locales include nine scatters or dumps, four foundations or depressions and a water control structure.

DATES: Middle and Late Prehistoric sites were identified based upon Old Women's, Pelican Lake and McKean points recovered. The presence of ceramics at some of the sites also fits with this picture.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment The Little Bow River Project ASA Permit Number 89-82," by Thomas H. Head, Sharon Lee Hanna and Thayer V. Head

89-83

G. S. L. Stuart
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Husky Oil Operations
Ram River Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project is located in the western Alberta plains. The major drainages in the study area are the Clearwater, Raven and Tay rivers, and Base Line, Swan, East Stony and West Stony creeks. The proportion of the right-of-way assessed is predominantly level. It intercepts an unnamed tributary of West Stony Creek, as well as an ephemeral creek.

METHODOLOGY: A pedestrian survey of the entire portion of the route between sections 25 and 29-34-7-W5M was undertaken, and an intensive visual examination of all exposures within the proposed right-of-way were conducted. Shovel tests were excavated in areas lacking suitable exposures and at the crossings of streams.

RESULTS: No sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Husky Oil Operations Ltd. Ram River Project," by Fedirchuk McCullough and Associates

89-84 and 89-98	**Gloria J. Fedirchuk** **Eugene Gryba** **Fedirchuk McCullough & Associates Ltd.** **304, 1725 - 10 Avenue S.W.** **Calgary, Alberta**	**Melcor Developments Arbour Lake Development**

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The proposed residential development is located in Section 15-25-2-W5M. A deep valley separates the two quarter sections. The terrain, in general, is somewhat hilly. Most of the flat terrain is located in the vicinity of site EgPn-206, in the extreme northeastern portion of the development zone.

METHODOLOGY: Seven archaeological sites (EgPn-188 to 193 and 206), located within the planned Arbour Lake development, were assessed under permit 89-84. Significant prehistoric remains were encountered during the shovel test assessment program at site EgPn-206 to warrant limited salvage excavations. Mitigative excavations at site EgPn-206 were undertaken under permit 89-98. In addition, the project entailed drafting an accurate site map of EgPn-206, as well as detailed maps of individual stone rings at all of the above-mentioned sites.

RESULTS: Eleven previously unrecorded stone features were inventoried at site EgPn-206.

REPORT: Complete, entitled "Assessment and Mitigation of Archaeological Sites on Melcor Developments Ltd.

Planned Arbour Lake Development," by Fedirchuk McCullough and Associates

89-85

Brian O.K. Reeves
ARESCO Ltd.
P.O. Box 1174, Station G
Calgary, Alberta

G. Boyko
West Bow River
Ammonite Mine

PROJECT TYPE: HRIA

LOCATION/SETTING: The project is located west of the Bow River, in the Bow City area. The study area consisted of two proposed mine sites within a surface mine lease of approximately 3.75 sections. It is situated on prairie level, the valley wall and on the valley floor, immediately west of the Bow River.

METHODOLOGY: Foot traverses and subsurface testing by shovel were employed as necessary.

RESULTS: Seven native stone feature sites, ranging from small tipi ring sites of two or so rings and associated cairns to large complex sites with rings, cairns, effigies, sweat lodge pits and sacred circles, were located. Remains of a white homestead foundation were also recorded. All sites lie outside the 1989-1990 development areas and will not be impacted.

REPORT: Complete, entitled "Historical Resources Impact Assessment, West Bow River Ammonite Mine Near Bow City, Alberta; Final Report, Permit 89-085," by Brian Reeves and Colin Poole

89-86C

Gloria J. Fedirchuk
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304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Alberta Culture and Multiculturalism/
Alberta Transportation
Site EkPj-35 Excavation

PROJECT TYPE: Mitigation

LOCATION/SETTING: EkPj-35, Dersch locality, Besant adjunct to Head-Smashed-In, is named after the owner of the land on which the site is located. This site is situated in the lee of the bedrock ridge and immediately south of the Head-Smashed-In interpretive center, in the southern grasslands of Alberta. The excavated portion of the site lies on a knoll overlooking a natural spring and coulee to the east.

METHODOLOGY: A block excavation composed of 33 sq. m and 11 isolated 1 m units were excavated by trowel. The Besant living floor was readily identifiable by large quantities of fire-broken rock. Six features were encountered; all were overlain by a layer of fire-broken rock:
Feature 1 - bone-filled pit
Feature 2 - pavement of fire-broken rock
Feature 3 - an excavated bone and fire-broken rock filled basin
Feature 4 - inverted bison cranium surrounded by large sandstone slabs
Feature 5 - basin-shaped hearth
Feature 6 - bone (possible bison cranium) - not completely excavated.
Laboratory analysis will include lithic and bone identification, size and weight tabulation of fire-broken rock and bone per 10 cm level per unit, material type and debitage count per 10 cm level per unit. Radiocarbon analysis of bone will be undertaken to date time of occupation more precisely.

RESULTS: To date, only the field component of the project has been completed. Nine projectile points, all Besant, were identified during the excavations.

DATES: Absolute dates are as yet unavailable; however, the projectile points clearly indicate a single occupation with a relative date of between A.D. 1,250 and 750.

REPORT: Incomplete, to be entitled, "DkPj-35, Dersch Locality, Besant Adjunct to Head-Smashed-In," by Gloria J. Fedirchuk

89-87 **Cancelled**

89-88

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Gulf Canada Resources
Karr Pipeline Project
Fir Gas Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed Karr Pipeline project is located along the Smoky River, southwest of Grande Prairie, Alberta. Topography consists of predominantly level to gently undulating uplands. The Fir Gas project is located south of Fox Creek, Alberta, near the confluence of the Berland and Athabasca rivers.

METHODOLOGY: The portions of the proposed Karr Pipeline right-of-way requiring assessment were traversed on foot. Much of the right-of-way follows existing road rights-of-way and cutlines, providing excellent exposures for visual examination. Exposures created by construction activities at the proposed central site were also examined. Subsurface tests were excavated in areas lacking fortuitous exposures and where archaeological potential was considered to be good.

Portions of the Fir Gas project considered to be of high archaeological potential were traversed on foot. All exposures associated with existing roads, cutlines, well site development and camping areas were examined, and shovel tests were conducted in areas where exposures were not encountered.

RESULTS: No sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Gulf Canada Resources Limited Karr Pipeline Project Fir Gas Project," by Fedirchuk McCullough and Associates

89-91 and 89-92	**Barry J. Dau Ethos Consultants Ltd. Box 20, Route 5 Medicine Hat, Alberta**	**MPE Engineering SMRID Saunder to Murray Reach Canal Relocation**

PROJECT TYPE: HRIA (89-91) and mitigation (89-92)

LOCATION/SETTING: The portion of the St. Mary River Irrigation District (SMRID) Saunder to Murray Reach Irrigation canal involved in this project is situated in the SE-24-11-8-W4M. It is located on gently rolling terrain, mostly cultivated, northwest of the village of Seven Persons.

METHODOLOGY: During the assessment phase of the program, an area of approximately 2.0 ha was examined. Major relocation of the Saunder to Murray Reach irrigation canal is planned in this area. All portions of the 2.0 ha segment were examined by foot traverse survey utilizing linear or zigzag transects 5-10 m in width. All natural exposures within the locale were also examined for the presence of buried cultural materials.

In the second phase of the project, limited feature mapping and auger testing were undertaken at all surface stone features in the identified site (DlOr-8). In addition, a total of 10 sq. m was excavated within and adjacent to one feature (stone circle 5). Excavations were taken to 20 cm below surface.

RESULTS: During the assessment phase of the project, a single surface stone feature site (DlOr-8) was identified. Most of the site was threatened with disturbance due to canal construction. In the mitigation phase, 51 auger holes, encompassing 1.53 sq. m, were drilled within and adjacent to five stone circles and one cairn. A total of 10.83 sq. m was dug within and adjacent to stone circle 5. Only 12 pieces of cultural material were collected during work at DlOr-8; none was diagnostic.

SITE TYPE: Stone circles, cairn

REPORT: Complete, entitled "An Historic Resources Impact Assessment and Mitigation Program at a Proposed Irrigation Canal Relocation Northwest of Seven Persons, Southeastern Alberta - ASA Permits 89-91 and 89-92," by Barry J. Dau

89-93

Brian O.K. Reeves
Lifeways of Canada
1717 - 10 Avenue S.W.
Calgary, Alberta

Neste Oy
Methyl Tertiary Butyl
Ether Facility

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed production facility is located in the county of Strathcona, in an area of gently rolling morainal topography which has been cultivated since the turn of the century.

METHODOLOGY: A foot reconnaissance of the project area was conducted, and 46 backhoe pits were excavated.

RESULTS: Three prehistoric sites (FjPi-95, 96 and 97) were located during the ground reconnaissance. In addition, an historical structure was located in the extreme northwest corner of the property.

SITE TYPES: Isolated finds, historical railway grain car

REPORT: Complete, entitled "Historical Resources Impact Assessment Neste Oy Methyl Tertiary Butyl Ether (MTBE) Facility SW32-52-23-W4M," by B.O.K. Reeves

89-95

Brian O.K. Reeves
Lifeways of Canada
1717 - 10 Avenue S.W.
Calgary, Alberta

340490 Alberta Limited
Hidden Valley
Subdivision

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The subdivision is located in the Hidden valley area of north Calgary. The lands are characterized by a 24 m, gravel-filled terrace fronted towards Beddington Creek by a 12 and 4 m silt-filled, bedrock-cored terrace. The parcel was part of a former mixed farming operation. A small portion was under cultivation; the remainder was is pasture.

METHODOLOGY: The HRIA included both a foot reconnaissance of the lands and backhoe prospecting to search for buried sites.

RESULTS: Four sites were identified. Two sites (EgPm-256 and 259) are within the proposed subdivision. They will be removed in subdivision development. No further studies are recommended. The other two sites (EgPm-257 and 258) are located outside the subdivision.

SITE TYPES: Buried campsites, tipi rings

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Portion of E 1/2 20-25-1-W5M Hidden Valley, Calgary, Alberta," by Brian Reeves

89-96

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

NOVA Corporation
Caribou Lake Lateral

PROJECT TYPE: HRIA

LOCATION/SETTING: A total of 10.4 km of the 72 km pipeline right-of-way was examined. This included upland areas, three water crossings, including the Sand and Wolf rivers, and a lake shore and associated landforms.

METHODOLOGY: File searches were conducted to identify previously recorded sites in the study area. Seven areas were examined in the field, and judgement shovel tests were dug.

RESULTS: A single prehistoric site (GhOq-1) was identified.

SITE TYPE: The small site appears to represent a single, short-term event where stone tools were manufactured or resharpened after use.

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Caribou Lake Lateral ASA Project Number 89-96," by Thomas Head

89-97

James A. Light
Historical Resource Management
910, 1335 - 12 Avenue S.W.
Calgary, Alberta

Dennis Dancey
Pine Lake Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed subdivision is located on the east shore of Pine Lake in central Alberta. The area is characterized by hummocky ablation moraine and aspen parkland vegetation.

METHODOLOGY: The subdivision was walked in transects, and shovel tests were dug in areas with moderate to high potential for buried site.

RESULTS: No historical resource sites were encountered.

REPORT: Complete, entitled "Historical Resources Impact Assessment of the Dancey Subdivision on Pine Lake, Final Report, Permit 89-97," by James Light

89-98 **(see 89-84)**

89-99 and 89-102

Rebecca J. Balcom
Environmental
Management Associates
1510 - 10 Avenue S.W.
Calgary, Alberta

N. McKenzie and
Assoc./Canadian
Hunter Exploration
Canhunter Coleman
Well Site

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: The well site is located in Section 18-11-3-W5M, on an intermediate terrace on the north side of Dutch Creek. This is in the Livingstone Range of the Rocky Mountains. The well site encompasses about 8 ha.

METHODOLOGY: Impact assessment included foot traverses of the area to be developed and visual examination of the ground surface and exposures. Shovel tests were excavated as appropriate to search for buried sites and to aid in assessing sites. At DlPo-14, 11 sq. m were excavated in the western portion of the site. Excavation was not undertaken in the eastern portion of the site because it appeared that little of the site was left there.

RESULTS: Previously recorded site DlPo-14 was located and re-evaluated. Impact assessment and mitigation of this site yielded 34 artifacts (projectile point midsection, biface fragment, flake tool, flakes and shatter), as well as fire-broken rock.

SITE TYPE: Campsite

DATE: Approximately 8,000 years BP

REPORT: Complete, entitled "Historical Resources Impact Assessment and Mitigation Canhunter Coleman 4-18-11-3 Final Report, 89-99 and 89-102," by Rebecca J. Balcom

89-100

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Alberta Transportation
and Utilities
Gliechen Area
Aggregate Extraction

PROJECT TYPE: Mitigation

LOCATION/SETTING: The study area occupies one quarter section in complex, hummocky topography approximately 7 km east of Cluny. Crowfoot Creek lies to the east. Vegetation is native prairie grasses.

METHODOLOGY: Field methods consisted of compiling site and feature maps. Uncontrolled surface collection was undertaken as appropriate.

RESULTS: As a result of the mitigation, seven sites - including 10 tipi rings and 12 cairns - have been mapped. Plan maps of all features have been completed. No artifacts were found on the surface.

SITE TYPES: The following sites, all of unknown cultural affiliation, were mitigated:
EePe-3 - tipi ring (1)
EePe-4 - cairns (5)
EePe-7 - cairns (5)
EePe-8 - tipi rings (3)
EePe-9 - tipi ring (1), cairn (1)
EePe-10 - cairn (1)
EePe-11 - tipi rings (5)

REPORT: Complete, entitled " Historical Resources Impact Mitigation Sites EePe-3, 4, 7, 8, 9, 10 and 11 Final Report, Permit 89-100, by Environmental Management Associates

89-101

Stanley Van Dyke
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Cardinal River Coals
Coal Mine Expansion

PROJECT TYPE: HRIA

LOCATION/SETTING: Archaeological survey was conducted of selected locales in two parcels, the Freehold and the 50-A Baseline Extension areas, encompassing 2,130 ha and located 45 km south of Hinton, Alberta. Study areas consisted of portions of the drainages of Gregg River, Sphinx Creek, Drinnan and South Drinnan creeks at the base of the front ranges of the Rocky Mountains.

METHODOLOGY: Archaeological survey for prehistoric sites was done along specific drainages. Historical site recording and supporting archival studies of structures related to the Cadomin Mine (1917-1952) were also performed.

RESULTS: One prehistoric site (FgQi-7) was reassessed, and two additional prehistoric sites (FgQi-13 and 14) were identified. FgQi-7 consists of dense concentration of lithic materials. FgQi-13 and 14 consist of small lithic finds. Twenty-six historical structures were also recorded with detailed recording of permanent structures including mine entry and hoist complex and fan houses.

SITE TYPES: Prehistoric lithic concentrations and historical aged mine structures

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment, Freehold and 50-A Baseline Extension, ASA Permit Number 89-101," by Stanley Van Dyke with Lorry W. Felske

89-103

Wendy J. Unfreed
Bison Historical Services
3, 227 - 14 Street N.W.
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Alberta Transportation and Utilities
Pembina Resource Road

PROJECT TYPE: Mitigation of impacts, prehistoric sites FjQd-5, FiQc-1 and 2; survey of selected road sections

LOCATION/SETTING: The areas of investigation are located south of the McLeod River, approximately 20 km southwest of Edson, Alberta.

METHODOLOGY: Fifteen square metres were excavated at sites FiQc-1 and 2, while 10 square metres were excavated at FjQd-5. Excavation was conducted in 50 x 50 cm horizontal proveniences and 10 cm vertical proveniences. All excavated matrix was screened through 1/4 inch mesh screen. In addition, foot traverses were made along an 18 km length of the southern end of the 60 m wide right-of-way.

RESULTS: Based on debitage analysis, sites FiQc-1 and FiQc-2 were identified as lithic reduction sites. FjQd-5 yielded only a single quartzite core and five pieces of debitage in association with small amounts of fire-broken rock. Foot survey of the southern section of the right-of-way indicated the existence of two additional lithic reduction sites near Raven Creek.

REPORT: Complete entitled "Final Report Historical Resources Mitigation Pembina Resource Road, ASA Permit Number 89-103," by Wendy J. Unfreed and Thomas Head

89-104

Thomas Head
Bison Historical Services
3, 227 - 14 Street N.W.
Calgary, Alberta

Alberta Transportation and Utilities
1989 Highways Mitigation

PROJECT TYPE: Mitigation excavation of FbPh-9 and FbPg-4 along SR 597

LOCATION/SETTING: The sites are located south of Alix, Alberta, just north of the Red Deer River.

METHODOLOGY: Field work consisted of controlled surface collection from FbPg-4, documentation of private collection from the area, and controlled excavation of 51 sq. m at FbPh-9.

RESULTS: Surface collections from FbPg-4 resulted in limited data retrieval. The private collection contained materials from the Middle and Late Prehistoric periods, but these were of an uncontrolled nature. Excavations at FbPh-9 were much more productive. Excavations focused on an occurrence of bone in a cutbank of Haynes Creek. Four occupations, one of which contained a rock ringed hearth, were identified in a 13 sq. m area. Shovel testing in adjacent areas revealed stratified bone and cobbles in a second area. Thirty-seven metres were excavated in this area, and a buried stone circle attributable to the Late Prehistoric Period was revealed. It contained a central rock ringed hearth and large quantities of butchered bone. Ephemeral occupations were identified above and below the main floor.

SITE TYPE: Stratified campsite/stone circle

DATE: At least two Late Prehistoric occupations were identified on the basis of points recovered from the buried stone circle.

REPORT: In preparation

89-105

Walt Kowal
Walt Kowal Consulting
6816 - 105A Street
Edmonton, Alberta

Western Oilfield
Environmental
Services
Calgary Pipeline
Expansion

PROJECT TYPE: HRIA

LOCATION/SETTING: The pipeline corridor is approximately 22 km long and 7 km wide. The HRIA was centred on the pipeline right-of-way (approximately 30 m wide) and encompassed approximately 138 ha. Approximately 50% of the area is muskeg; 35% is sandy dunes covered with spruce/pine forest; and 15% is mixed aspen/conifer forest located on the most elevated portions of the dunes. The topography of the study area is flat to gently rolling.

METHODOLOGY: In-field investigations consisted of a helicopter survey of the proposed development area and surface and subsurface ground examinations for cultural materials. Areas chosen for detailed examination were selected on a judgmental basis by visual examination of vegetation cover and topographic relief. Locations that were well drained or where exposed surfaces were evident were the preferred sampling in areas, but areas of lower and medium potential were also tested. A video tape was made of the survey area to record the ground cover, topography and subsurface conditions and was used as part of the verbal report.

RESULTS: No subsurface artifacts were located in the study area. The survey resulted in no new archaeological resource sites. This study concludes that the lands to be impacted are of limited archaeological value, and it was recommended that development be allowed to proceed.

REPORT: Complete, entitled "Historical Resources Impact Assessment Primrose North Gas Pipeline Project Final Report Permit 89-105," by Walt Kowal

89-107	**Thomas Head** **Bison Historical Services** **3, 227 - 14 Street N.W.** **Calgary, Alberta**	**NOVA Corporation** **Ricinus South Lateral Loop**

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed right-of-way is located approximately 15 km northwest of Sundre, Alberta. Approximately 90% of the line traverses an area of mixed wood forest. It is located south of the James River which it generally parallels. The pipeline crosses Barry creek, a tributary of Bearberry Creek, and a number of small, unnamed drainages.

METHODOLOGY: Initial work included file searches to identify previously recorded sites in the study area. In the field, shovel tests were undertaken in areas of high potential.

RESULTS: No sites were located.

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Ricinus South Lateral Loop ASA Project Number 89-107," by Thomas Head

89-108	**Eugene M. Gryba** **DS Archaeological Consulting** **733 Woodbrier Place S.W.** **Calgary, Alberta**	**Thornmark Capitol Corporation** **Pine Creek Golf and Country Club**

PROJECT TYPE: HRIA

LOCATION/SETTING: The development area is located at the confluence of the Pine Creek and Bow River valleys. It is on the west side of Bow River, several kilometres south of Calgary. The land at the prairie level, which extends away from the south edge of Pine Creek valley, is characterized by low, rolling terrain. In the western half of the project area, the prairie landscape is dissected by three prominent coulees which enter Pine Creek valley. All of the arable land has been brought under cultivation, except for a strip of open grassland, situated between the cultivated field and the valley rim, currently used as pasture land.

METHODOLOGY: Prefield studies included a search for previously reported sites in the area. Field work consisted of foot traverses and shovel and backhoe tests as necessary.

RESULTS: Thirty archaeological sites (EfPl-15, 17, 18 and 139 to 165) were recorded. No further work is required at most of these sites; however, further mitigation is recommended at sites EfPl-139, 143, 162 and 164.

REPORT: Complete, entitled "Historical Resources Impact Assessment Proposed Pine Creek Golf and Country Club in Southwestern Alberta," by Eugene M. Gryba

89-109

Rebecca J. Balcom
Environmental
Management Associates
1510 - 10 Avenue S.W.
Calgary, Alberta

Jason Properties
Patterson Heights
Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: The 136 acre proposed extension of the Patterson Heights subdivision is in southwest Calgary.

METHODOLOGY: Procedures included a site file search for previously recorded sites, foot traverses, shovel tests, and documentation and assessment of sites.

RESULTS: Four archaeological sites (EgPn-334 to 337) were recorded. No further work is recommended on these sites.

SITE TYPES: Lithic scatter, prehistoric campsites, concrete/pebble foundation and cobble/mortar chimney

REPORT: Complete, entitled "Historical Resources Impact Assessment Patterson Heights Subdivision Final Report, Permit 89-109," by Environmental Management Associates

89-110

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
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G.J.S. Resources
Crystal Pipeline Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed project is located in the western Alberta plains. Topography ranges from level to gently rolling in the northern portion of the route to hummocky in the central portion to gently undulating along the remainder of the route. The right-of-way crosses Battle Creek, in addition to two unnamed creeks, near its northern terminus. For most of the remainder of the route, the right-of-way parallels Lloyd Creek.

METHODOLOGY: File searches were conducted to identify previously recorded sites. Ground reconnaissance consisted of an intensive ground examination by two individuals of all high and medium potential areas. All exposures were examined visually, and shovel tests were conducted in areas lacking suitable exposures.

RESULTS: No sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment G. J. S. Resources Crystal Pipeline Project," by Fedirchuk McCullough and Associates

89-111

James A. Light
Historical Resource Management
910, 1335 - 12 Avenue S.W.
Calgary, Alberta

Terry Thiessen
Parkside Cabins and Convenience Store

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed development is located in the Bow River valley, southeast of the town of Carsland. The area is a flood plain of the river and has numerous flood and meander scars.

METHODOLOGY: The development area was walked in transects and shovel tested in areas with moderate to high potential for buried site. In addition, the area was deep tested using a backhoe to reveal deeply buried sediments.

RESULTS: No historical resource sites were encountered.

REPORT: Complete, entitled "Historical Resources Impact Assessment of the Parkside Cabins and Convenience Store, Final Report, Permit 89-111," by James Light

89-113

Edward J. McCullough
Fedirchuk McCullough & Associates Ltd.
304, 1725 - 10 Avenue S.W.
Calgary, Alberta

Bow Valley Industries Heart Lake Pipeline Project

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed pipeline project is located in the boreal forest zone of the western Alberta plains, in townships 69 and 70, ranges 10 and 11, W4M.

METHODOLOGY: A review of site files was undertaken to identify previously recorded sites which could be affected by the proposed development and to determine the nature of the database for the area. Ground reconnaissance consisted of inspection of all high and medium potential areas along the proposed right-of-way. All exposures were inspected visually for evidence of past human activity, and shovel tests were excavated in areas of high to medium potential which lacked fortuitous exposures.

RESULTS: No sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Bow Valley Industries Ltd. Heart

Lake Pipeline Project," by Fedirchuk McCullough and Associates

89-114

Rebecca A. Murray
Borealis Consulting
Box 324
Beaverlodge, Alberta

Alberta Energy Co.
Gold Creek Well Site
and Access Road

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed well site and access road are located approximately 15 km southeast of Grande Prairie and utilize 5.07 ha along an existing trail and .356 ha of stable forested sand dunes.

METHODOLOGY: The access road had good surface visibility and was traversed on foot. Shovel tests were dug where appropriate. The well site was systematically shovel tested.

RESULTS: One site (GgQp-1), consisting on a quartzite flake, was found on the access road.

SITE TYPE: Isolated find

REPORT: Complete, entitled "Historic Resources Impact Assessment, Alberta Energy Company Ltd. AEC et al Gold Creek 6-30-70-4 Well Site and Access Road, Permit No. 89-114," by Rebecca Murray

89-117

Brian O.K. Reeves
1717 - 10 Avenue S.W.
Calgary, Alberta

Orville Shockey
Rio Vista Estates

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed subdivision is located on the east side of the Oldman River, north of Taber, overlooking the Oldman River valley. The 56 ha of land, largely undisturbed prairie, will be subdivided into 22 lots

METHODOLOGY: Prefield studies included a search of ASA site files and other documents to determine if any sites had been recorded previously in the area. A foot reconnaissance, focusing on the bluff tops, was carried out in November, 1989. Backhoe testing was undertaken along the bluff tops to prospect for and evaluate the potential for buried sites.

RESULTS: Two mine sites and two native archaeological sites (DlPa-7 and 11) were identified. One mine is represented by a cement block foundation and is located on a lot that will not be developed. The second mine is marked by a scatter of coal and some metal refuse and is of no particular significance. Mitigation activities are recommended for the prehistoric sites.

SITE TYPES: Historical mine remains, tipi ring and cairn site, buried campsite

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Rio Vista Estates, Portions of Sections 20, 29 and 30 Township 10, Range 16, West of the 4th Meridian," by Brian Reeves

89-118 **Cancelled**

89-119 **Cancelled**

89-120

Barry J. Dau **Ethos Consultants Ltd.** **Box 20, Route 5** **Medicine Hat, Alberta**	**SaskOil** **Many Islands Lake** **Well Sites**

PROJECT TYPE: HRIA

LOCATION/SETTING: The project consisted of the assessment of three proposed gas well sites, situated on moderate to strongly rolling terrain, immediately north of Many Islands Lake.

METHODOLOGY: The entire surfaces of the proposed well sites and their access roads were examined by foot traverse surveys using linear or zigzag transects 5-10 m in width. Areas up to 100 m outside the developments were inspected as well. All natural exposures were examined for the presence of buried cultural materials. Shovel testing was not employed since natural subsurface exposures were present in abundant quantities.

RESULTS: During the course of the HRIA, a single surface stone feature site, EbOm-6, was found within and adjacent to the proposed well site and its access road. No diagnostic cultural materials was found in the site. The well site was relocated to avoid the site.

SITE TYPES: Site EbOm-6 is composed of 12 stone circles.

REPORT: Complete, entitled "An Historic Resources Impact Assessment of Three Proposed Gas Wellsites North of Many Islands Lake, Southeastern Alberta - ASA Permit 89-120," by Barry J. Dau

89-122	**James A. Light** **Historical Resource Management** **3112 - 41 Street S.E.** **Calgary, Alberta**	**Donnelly, Quinn, Young Architects** **Western Heritage Centre**

PROJECT TYPE: HRIA

LOCATION/SETTING: The proposed Western Heritage Centre is located on the site of the Cochrane Ranch site near the town of Cochrane.

METHODOLOGY: The archaeological assessment was not carried out under ideal conditions. It was done in late November with a significant snow cover over the entire area. Surface visibility was nil, and the top 10 cm of soil were frozen, making shovel testing problematical. Fortunately, engineering studies of the subsoils were required by the architects, and the archaeological work was conducted in conjunction with this testing. Subsurface testing was done by removing topsoils with a backhoe. The topsoils were set aside and were screened through a 6 mm screen. Deeper soils were then excavated and examined for archaeological material. The exposed profiles of the trenches were examined for buried soil horizons.

RESULTS: Only one prehistoric site (EhPo-78) was found in the proposed development area.

REPORT: Complete, entitled "Historical Resources Impact Assessment Western Heritage Centre Final Report, Permit 89-122," by James A. Light

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